AUTOMOTIVE INDUSTRIES

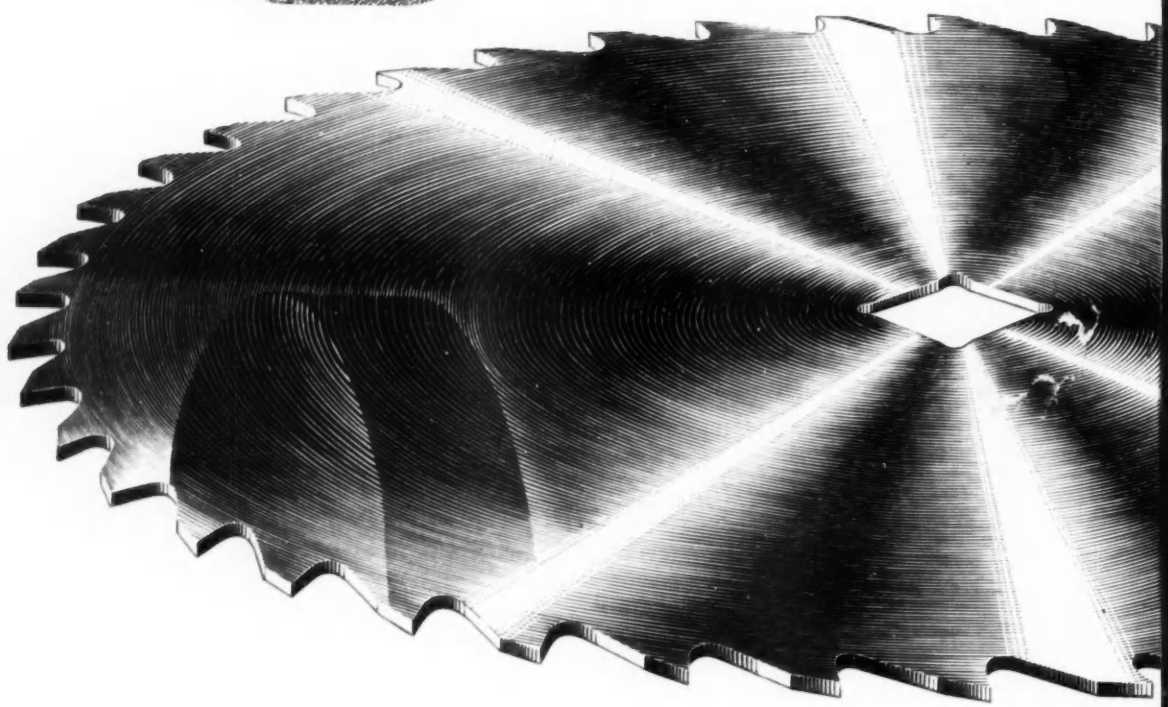
NOVEMBER 15, 1953

AUTOMOTIVE and AVIATION MANUFACTURING
CIVILIAN AND DEFENSE
ENGINEERING • PRODUCTION • MANAGEMENT

In This Issue... French Automobile Salon · · · New Fordson Tractor · · · Two Power Steering Developments · · · Tooling at Perkins Diesel Plant · · · Big Gain in Vehicle Registrations · · · Body Plant Scheduling Problems

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A CHILTON PUBLICATION



Saw blades ground

190% FASTER



Grinding the surface of a circular saw blade isn't a complicated operation, to be sure. But accuracy and precision are mighty important to the success of the end product. And minutes saved per part add up to an important reduction in manufacturing cost.

Here's a case where a Heald Model 261 Rotary Surface Grinder did the job 190% faster than by previous methods. The grinding operation is performed automatically, with maximum speed and precision, at the push of a button. Swiveling of the chuck produces a .005" taper toward the center of the blade. And loading is simply a matter of placing the blade over a center locating pin in the 12" magnetic gap chuck, with a drive pin between teeth as an extra safeguard against slippage under heavy cuts.

Remember—when it comes to precision finishing, it pays to come to Heald.

Internal and Rotary
Surface Grinding Machines
and Bore-Matics

HEALD

THE HEALD MACHINE COMPANY

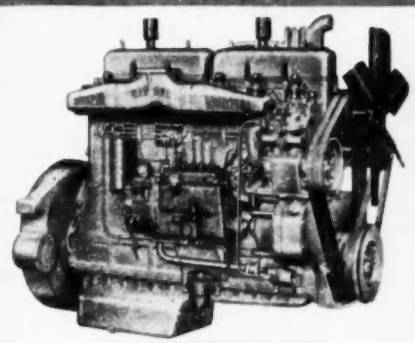
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PAYLOAD POWER PLANT

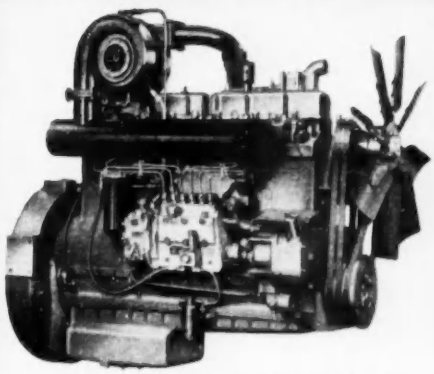
148 *Diesel* -SERIES-145 *Gasoline*



148-DKB—NORMAL DIESEL
779 cu. in. Max. hp 200 @ 2100 rpm.



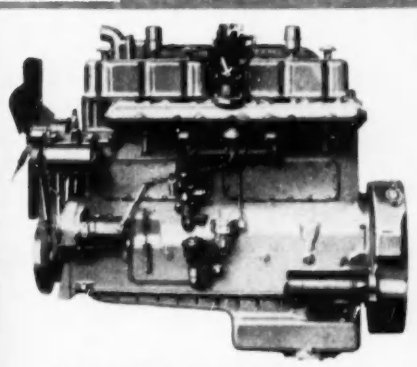
FAST
SMOOTH
POWERFUL



148-DKBS—TURBOCHARGED DIESEL
779 cu. in. Max. hp 280 @ 2100 rpm.

SEND FOR BULLETINS

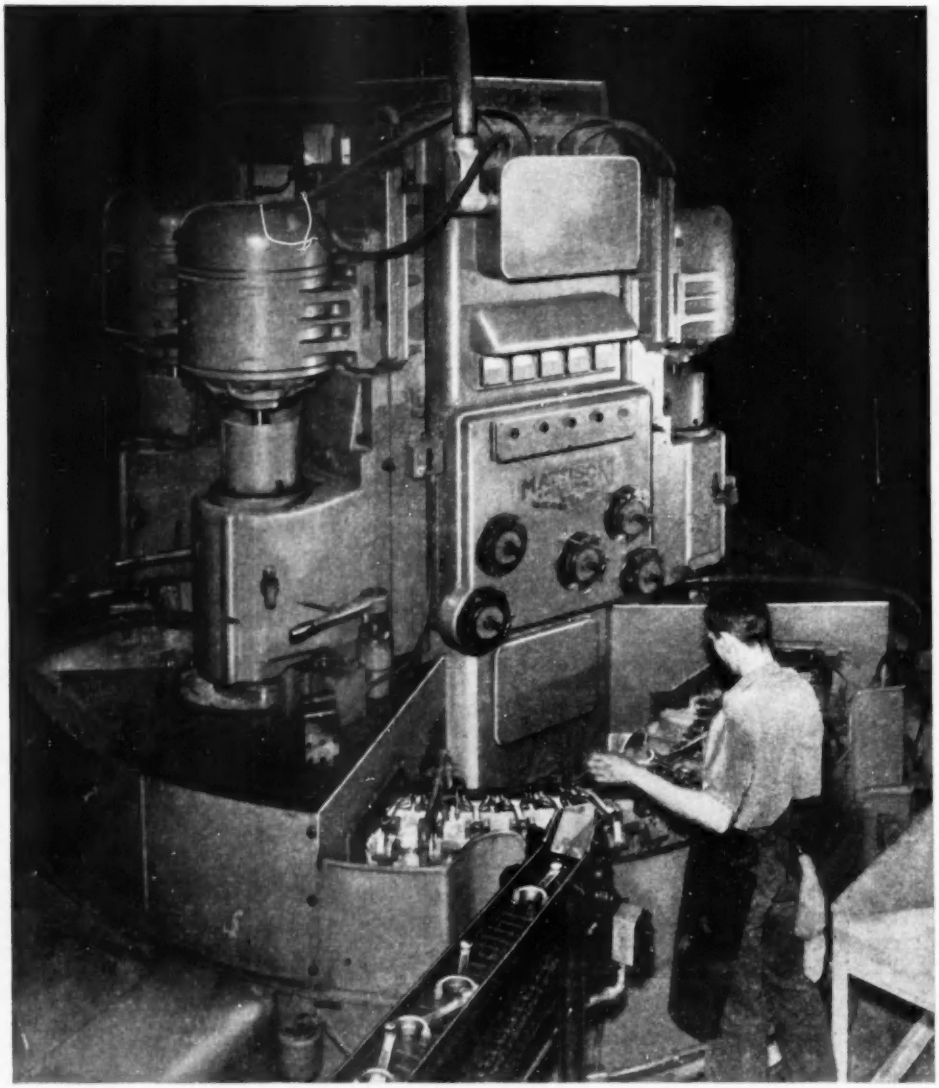




145-GKB and 145-GZB—GASOLINE
779 and 817 cu. in. Max. hp 240 and 250 @ 2400 rpm.

223

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES



● At the Cleveland Engine Plant of the Ford Motor Company, both sides of wrist-pin and crank-pin bosses are accurately ground on a high production basis with this five wheel Mattison (Hanchett-Type) Vertical-Spindle Automatic Rotary Surface Grinder. Work pieces are held in automatic clamping fixtures. Automatic sizers are constantly in operation checking the work and keeping all pieces within specified tolerances without operator's attention.

This is only one of the many grinders made by Mattison. Whatever your surface grinding problems may be, write us for our recommendations on the proper method and machine for your job.

MATTISON MACHINE WORKS

ROCKFORD • ILLINOIS

A CHILTON MAGAZINE

AI AUTOMOTIVE INDUSTRIES

PUBLISHED SEMI-MONTHLY

NOVEMBER 15, 1953 VOL. 109, NO. 10

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As part of its worldwide automotive and aviation news coverage, AUTOMOTIVE INDUSTRIES is serviced by International News Service and has editorial correspondents in major United States and foreign industrial centers.

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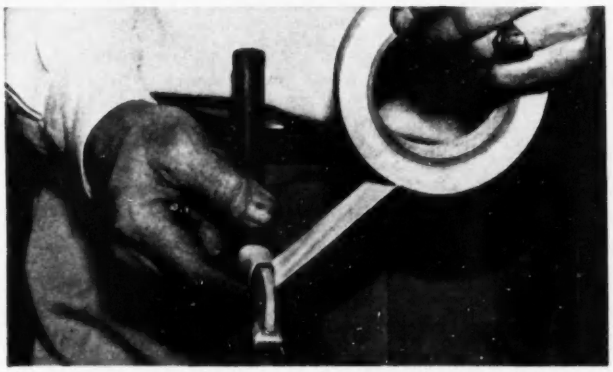
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Fireproof *Polyken* tape insulates fiber sleeve from intense arc welding heat.



Fiber insulating sleeve gets fireproof jacket of *Polyken* Tape No. 290.

Now they fireproof insulation with tape *(OF ALL THINGS!)*

Maker of welding rod holders stops breakdown of insulating sleeves with new *Polyken* fireproof tape

Tweco of Wichita was building a fine welding rod holder—but the product had an "Achilles heel" that was making service costs soar. The fiber sleeve used as electrical insulation deteriorated under heat radiating from the 6000° F. welding arc. Plainly, the insulation needed insulating. But how?

Many materials were tested. But only one provided all the needed qualities—fireproof *Polyken* Tape No. 290. This tape protects the fiber sleeves so well they last 2 to 3 times longer. It sticks tight and stays stuck even under prolonged high temperatures. In fact, the older it gets the tighter it sticks.

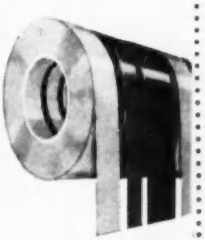
Tape No. 290 may not be the answer to your problem, but it's 10 to 1 there *is* a *Polyken* Tape that's tailored to one of your jobs. Tape can do things you never imagined—and save you time, money and effort in the bargain. Let our engineers study your case—you've nothing to lose but your problem!

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For physical properties, samples and further information on No. 290 and other *Polyken* Tapes, please send me your FREE BOOKLET, *Tape is a Tool.*

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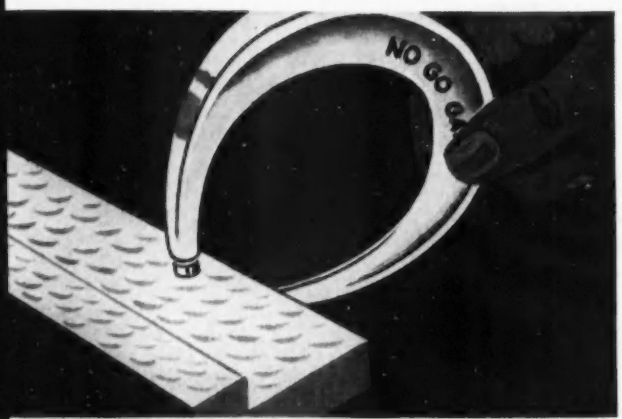
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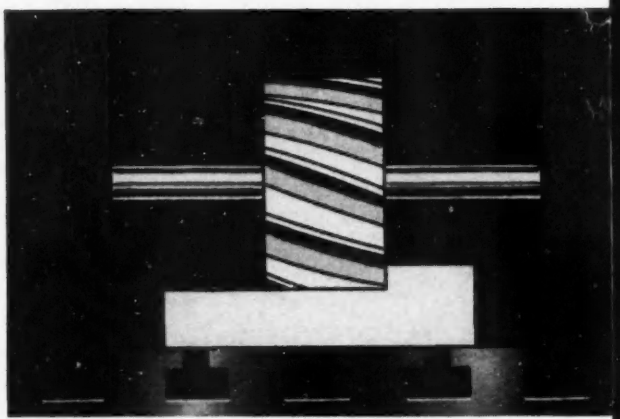
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HOW TO END DAMAGED WAYS, PRODUCTION LOSSES

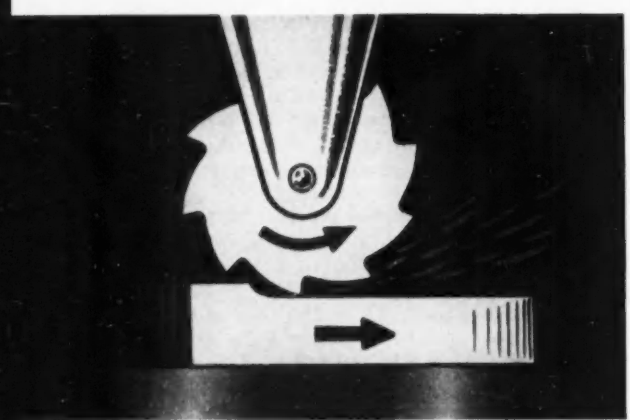
Sunoco Way Lubricant Stops "Jumpy Table"



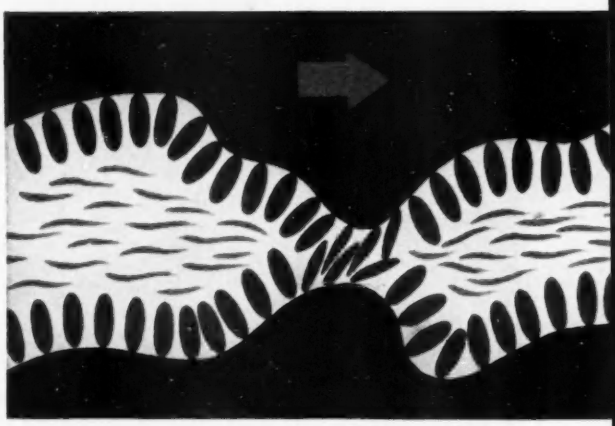
Tool chatter and jumpy table are machining headaches. Too often they cause poor surface finish, failure to hold tolerances, production losses.



Tool chatter is a result of a lack of rigidity in either the machine or the set-up. It is a mechanical problem and no lubricant can lick it.



Jumpy table is a stick . . . slip . . . stick . . . slip action of the table. It is a lubrication problem. Though just as damaging as tool chatter, it is not always detected when the cause of poor surface finishes.



Extreme magnification

Sunoco Way Lubricant cures jumpy table. It contains special compounds that form a film, like the nap of a rug, on the sliding surfaces and minimize the force of both static and kinetic friction.

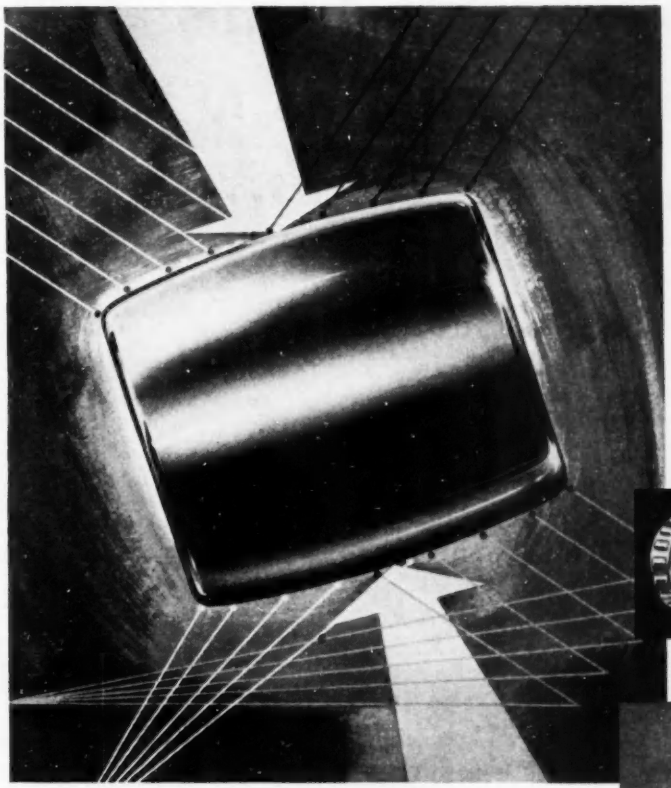
Why take a chance of damaging your ways? These integral parts of the base casting for your machine are difficult to refinish and costly to replace. For information about Sunoco Way Lubricant, call a Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. AA-11.

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NEW HYATT BARREL BEARING

now available in volume!

Industrial designers and engineers seldom make changes in bearing specifications. But when they discover something *really new*—like Hyatt's BARREL BEARING—out come the blueprints! *And this time they know they've got something!* Hyatt's new Barrel Bearing combines dual-purpose design with self-aligning action. It takes load from any direction and operates at full efficiency under conditions of misalignment! And, because barrel-shaped rollers provide high load capacity with low friction, this unique bearing is ideal for a wide range of applications. Best of all, the *cost* is far lower than you would expect! Find out how to improve *your* product . . . Consult a Hyatt Sales-Engineer, or write for our new Barrel Bearing catalog.



HYATT ROLLER BEARINGS

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION, HARRISON, N. J.

UNITED SPECIALTIES *Expands Production Facilities to meet Increasing Customers' Needs...*

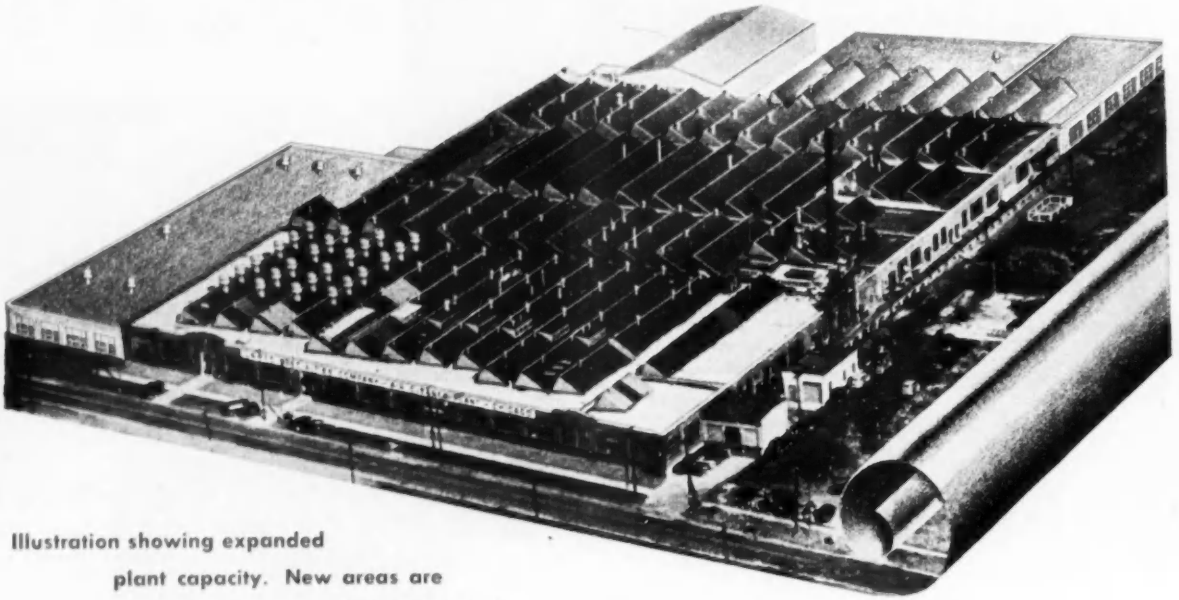


Illustration showing expanded plant capacity. New areas are indicated in red.

With plant facilities taxed to the utmost to supply an ever increasing air cleaner demand, United Specialties Company blueprints a much needed expansion program. Today, at a cost of over $900,000, improvements including 54,000 square feet of new floor space, 30 new presses and a modern, streamlined welding department are helping turn out oil bath air cleaners at a record rate.

Half a Million Dollars for Agricultural Units

Of the total appropriation, $500,000 has gone into expansion of facilities for production of agricultural air cleaners and pre-cleaners. This development has made possible entirely separate assembly lines for agricultural and automotive type air cleaners, with increased facilities for both. Today daily air cleaner production is above the 10,000 mark — an increase of approximately 20 percent.

Whatever your air cleaner requirements, United Specialties Company has the engineering experience — and the production facilities — to handle them. We invite your inquiry.



United Specialties combination oil bath air cleaner and pre-cleaner.



Hat-type cleaner used on passenger cars and trucks.

UNITED SPECIALTIES COMPANY

United Air Cleaner Division — Chicago 28 Mitchell Division — Philadelphia 36

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IGNITION AND TURN SIGNAL SWITCHES • DOVETAILS



12 of 15 maintenance award winners

USE ROSS STEERING

Ross STEERING

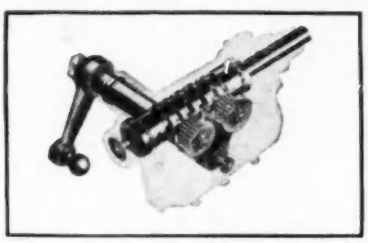
▶ **Long noted** for maximum steering ease and stability . . . minimum wear . . . simplicity and speed in any needed adjustment . . . Ross Cam & Lever Steering *scores again* in the 1953 Bus Transportation Maintenance Awards.

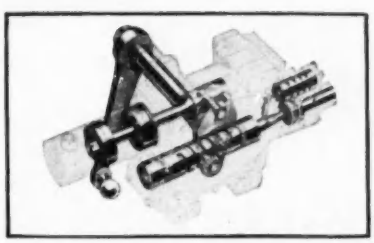
12 of 15 ***makes of equipment operated by the award winners use Ross Steering . . . convincing evidence of Ross dependability and economy.***

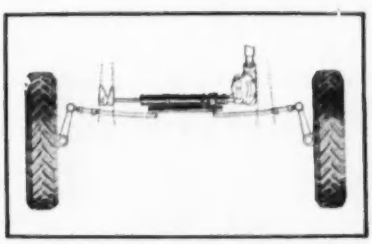
Whatever the steering job may be—buses, trucks, passenger cars, tractors, combines, boats, shovels, cranes, graders, etc.—*Ross assures ease, economy and safety.*

We invite discussion of *any* steering problem.

ROSS GEAR AND TOOL COMPANY · LAFAYETTE, INDIANA







CAM & LEVER MANUAL . . . HYDRAPOWER INTEGERAL . . . HYDRAPOWER LINKAGE

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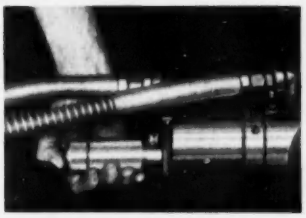
ACTION PICTURE
of how to save money by riveting!

This action photo, taken on the frame assembly line in one of the largest auto factories, illustrates how cost-conscious manufacturers save money with Hannifin "Hy-Power" Hydraulic Riveters.

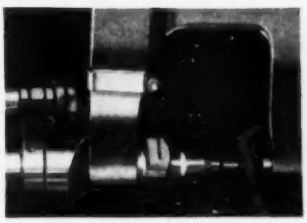
First step in assembly is to rivet the frame together... with Hannifin "Hy-Power" Riveters. The light-weight forged C-Frames hang from balancers within easy reach of each operator. No special skill is required to head the ⅜" rivets, cold, each in seconds. What's more, this "silent squeeze" method forms stronger, more uniform rivets, hot or cold.

Power source is the Hannifin "Hy-Power" Hydraulic Pressure Generator which quietly supplies pressure to the "Hy-Power" Cylinder that does the work. These riveters are available in 7½, 10, 12½, 17½, 25, 35, 50, 75 and 100-ton capacities.

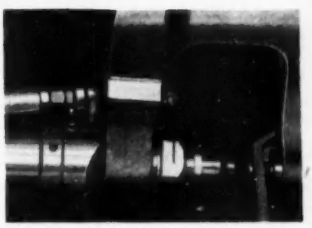
here's the HANNIFIN "HY-POWER" WORK CYCLE



In position. A single control button starts (or interrupts) the automatic Hy-Power cycle.



Ram approaches fast, then hydraulic pressure automatically intensifies, and the rivet head is formed.



Fast, automatic return. Total elapsed time to head a rivet is only 2 to 3 seconds.

"HY-POWER" CAN ALSO BE USED IN MULTIPLE TO SET SEVERAL RIVETS

Bulletin 150 tells how to save money on riveting, staking, punching, forming and bending operations. Write for copy.



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Air and Hydraulic Cylinders • Hydraulic Presses • Pneumatic Presses • "Hy-Power" Hydraulics • Air Control Valves

No. 1 in a Series



"He who makes no mistakes does nothing"

In a supposedly modern era it is sometimes claimed to be "smart business" to let a competitor take the lead and make profit from his mistakes. Obviously, if all business adhered to such a philosophy there would be no progress, if any business. "He who makes no mistakes does nothing". Cone leadership was founded — and is maintained — by active service, by doing things.

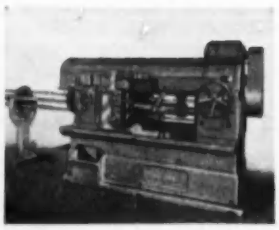
The Conomatic Carbide Development program expects to make a few mistakes. But, loss or gain, its efforts will contribute to the general benefit of all "automatic" users, users on whom all "automatic" builders are dependent.

The job illustrated compares actual production runs with HSS and 100% carbide tooling. It suggests the kind of pioneering that is being done at Cone. Full details are available.



MATERIAL—1112 STEEL: Hole drilled with 1" dia. drill to 2¾" depth. OD threaded to 2" length with 1¼"—12 chasers.

	HSS	CARBIDE
Cycle Time	90 secs.	**15 Secs.**
Work Spindle Speed	370 R.P.M. at 103 S.F.	**1500 R. P. M. at 417 S. F.**
Tool Wear	1500 pcs. per grind	**5000 pcs. per grind**



Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.



Start with welded tubing...
fabricate to your design

● There's practically no limit to the design requirements you can meet with Brainard Welded Steel Tubing. You can upset, swage, spin, flange, flatten, taper, or otherwise cold form it. It's an economical structural material—and pound for pound carries more load than any other shape.

Investigate the advantages of Brainard Welded Steel Tubing for *your* products. Write Brainard Steel Division, Dept. W-11, Griswold Street, Warren, Ohio. An integrated producer; offices throughout the U. S.



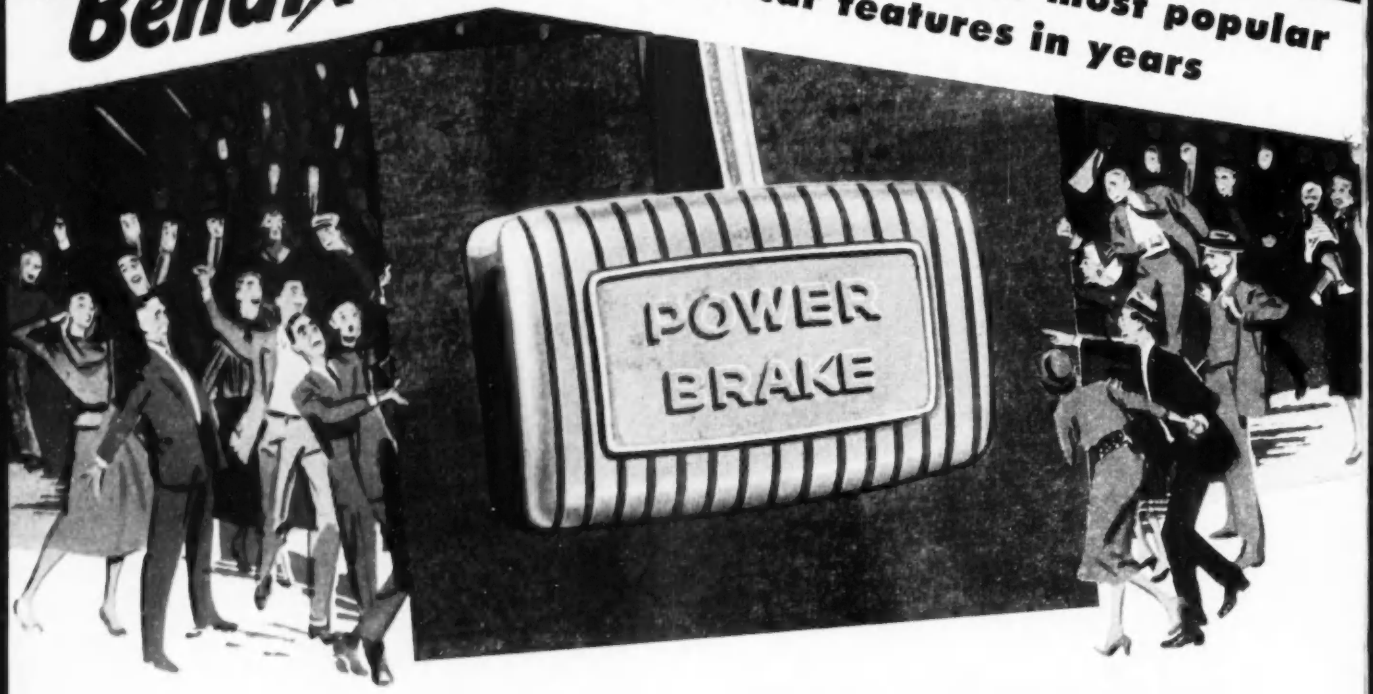
Upsetting is a simple operation. Uniform strength of Brainard Tubing is maintained in severe cold form operations.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

WELDED STEEL TUBING

Bendix Low Pedal Power Brake

one of the most popular new car features in years



Specified by More Car Manufacturers Than Any Other Make

Since the earliest days of the industry, car manufacturers have entered each model year with a host of new improvements that represent added value for the motoring public.

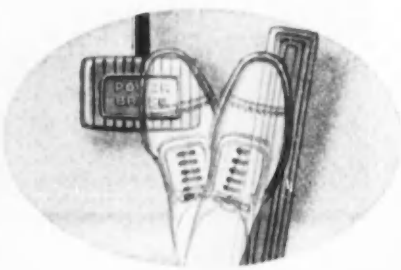
While all of these advancements have contributed to greater motoring enjoyment, the "new car features" that have basically altered previous motor car standards of performance are relatively few in number. For example, four-wheel brakes, a Bendix development, brought new safety to the highways; automatic transmissions materially increased driving ease; and today another great new feature, Bendix* Low Pedal Power Brake, is recognized as a revolutionary advancement in motor car control.

It is the only low pedal power brake that has met the test of millions of miles. In fact, Bendix Low Pedal Power Brake is specified by more manufacturers than any other make. It is the product of Bendix—world's largest producer of power brakes and leader in braking developments since the earliest days of the industry.

To make your line more popular it pays to equip with the performance proven Bendix Low Pedal Power Brake.

*REG. U.S. PAT. OFF.

NOW *Stopping* IS AS EASY AS *accelerating*



It is no longer necessary to lift the foot and exert leg power pressure to bring your car to a stop. With the Bendix Low Pedal Power Brake on about the same level as the accelerator, an easy ankle movement, much like working the accelerator, is all the physical effort required for braking. And by merely pivoting the foot on the heel, shifts from "go" to "stop" controls are made in far less time.

Result! MORE DRIVING COMFORT, LESS FATIGUE AND GREATER SAFETY

Bendix Products Division

BENDIX PRODUCTS DIVISION SOUTH BEND

Bendix
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High Spots of This Issue

★ Scheduling Problems in L-M Body Plant

In this article, the second of two on the assembly plant of Lincoln-Mercury Div., the author describes a masterpiece of integrated coordination between body styles and color combinations. Some complex finishing processes are also covered. Page 34.

★ Ross Linkage Type Power Steering

Presented here in diagrammatic form is a complete mechanical analysis of the linkage type power steering assembly recently announced by Ross Gear and Tool Co. Although most of the steering job is done by the unit, the driver maintains "feel." Page 38.

★ New Delevopments Attract Huge Crowds at Metal Show

One institution which certainly fattens upon itself is the National Metal Exposition, which recently marked its 35th anniversary. Held in Cleveland this year, it contained a number of new equipment, materials, and processes, reviewed here. Page 40.

★ Many New Models at French Automobile Show

A perennial highlight among the activities of Continental motordom, the annual French Automobile Salon included leading U. S. as well as European makes. The author covers in this report the main features of the most notable attractions. See Page 42.

★ Tooling Innovations at Perkins Diesel Plant

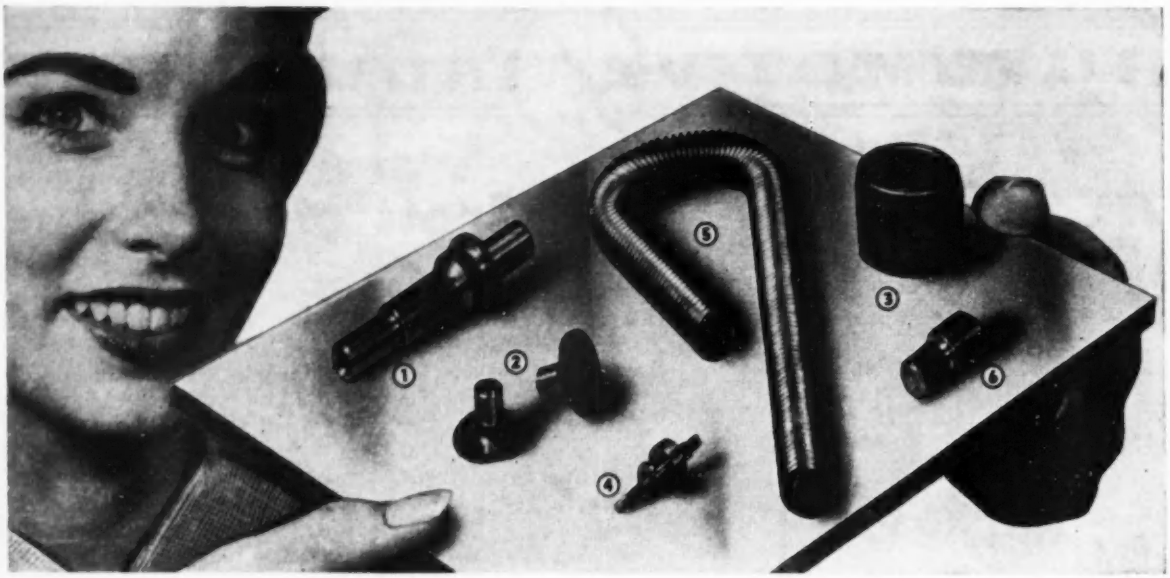
Ample proof of the performance qualities of the products of F. Perkins, Ltd., is found in the fact that the firm now has almost 100,000 engines in world-wide use. The modern methods by which these engines are produced are treated in detail. Page 46.

★ 48 New Product Items And Other High Spots, Such As:

1953 vehicle registrations up 4.8 per cent; Canadian-U. S. production engineers discuss mutual problems; quality improved by multiple-nut runners; Ainsworth's new power steering unit; implications of Chrysler-Briggs purchase; and details of new Fordson tractor.

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Complete Table of Contents, Page 3

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES
• BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY •
PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT
• SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT •
ENGINEERING • PRODUCTION • MANAGEMENT



Lead Lubricating Steel

increases production 43%

It is almost too good to be true—but, in Ledloy, lead actually lubricates the steel during machining, permitting greatly increased feeds and speeds. On job after job in shops throughout the country Ledloy is effecting net savings of 25% or more because it machines 30% to 50% faster than B-1113 and extends tool life as much as 200%.

The lead in this remarkable open hearth steel is so finely dispersed it cannot be seen with a microscope. Yet it reduces the friction between chip and cutting tool substantially. And Ledloy machines to an unusually clean smooth finish—case hardens effectively—bends, crimps, swedges or rivets easily.

Your nearby Ryerson plant now has large stocks of Ledloy rounds, squares and hexagons in a wide range of sizes. So get all the facts from your Ryerson representative or write for engineering data on Ledloy. And call Ryerson for quick shipment of this remarkable new free-machining steel.

How Ledloy Cut Costs on These Parts

1. ***BEATER SHAFT**—production increased 43% when shop switched to Ledloy from C-1117. Part is case hardened to 60-62 Rockwell C.
2. ***GOLF SHOE LUGS**—Ledloy succeeded where free-cutting Bessemer steels failed in this swedging operation. Took inside threads perfectly.
3. ***UNIVERSAL JOINT SOCKET**—formerly made from C-1117, production rose 72% with Ledloy. Part is case hardened to 60-62 Rockwell C.
4. ***DRIVE SHAFT**—result of changing from B-1113 to Ledloy: production increased more than 35%, over-all costs decreased 20%.
5. ***THREADED BAR**—the excellent cold-bending properties of Ledloy important here. Notice clear definition of thread and fine finish.
6. ***KNURLED STUD**—B-1113 originally used. Use of Ledloy resulted in 19.9% reduction in over-all costs, 54% increased in production.

*Company name and more detailed figures on request.

Principal Products: Carbon, Alloy & Stainless Steels—Bars, Structurals, Plates, Sheets, Tubing, Machinery & Tools, Etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
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News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 109, No. 10 November 15, 1953

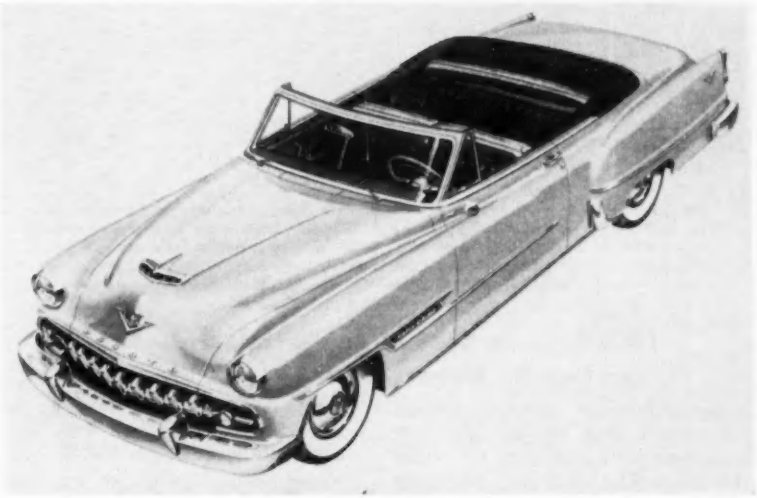
Sale of Willow Run by Kaiser to GM for $26 Million Made

Just at press time, word came through that General Motors had purchased the giant Willow Run plant from Kaiser Motors for $26 million. The sale does not include $30 million worth of tooling and other equipment.

During the next six months or so, Kaiser will move all of its operations to its Willys plant in Toledo. In the interim, GM will lease to Kaiser the space the latter now occupies at Willow Run.

In effecting the sale, Kaiser will pay off immediately $26.613 million of its Government debt. It will do so by turning over to RFC the entire purchase price, plus an additional $613,000. This will reduce the debt to $18.65 million.

GM had been leasing 1.5 million sq ft at Willow Run since August for the production of Hydra-Matic transmissions after the Livonia fire. It now has about 7000 workers there.



DE SOTO FOR 1954

Leather seat bolsters and pleated nylon upholstery distinguish the interior design of the 1954 De Soto convertible coupe. The Fire Dome V-8 engine has been stepped up to 170 hp from the former 160 hp, and its compression ratio raised from the previous 7.1:1 to 7.5:1. New mechanical features are said to be a shear-type front engine mounting and high-roll-center front suspension system of non-parallel arm type. The PowerFlite automatic transmission is offered as optional equipment on all models of both the Fire Dome V-8 and Powermaster Six.

Ford May Expand Line in Future

Ford probably will bring a new car into its line in about another year. It reportedly will be designed to compete in the price class between Mercury and Lincoln, now occupied by such cars as Buick, higher-priced Oldsmobile, De Soto, Chrysler Windsor, and others in that price area. It may be called the "Fairlane" after the Henry Ford ancestral estate.

Chevrolet's Shell Job Stretched Out

Stretchout of the shell program at the Chevrolet plant in St. Louis will result in a reduction of nearly 50 per cent in the number of employes there. The plant normally has been operating on two shifts, but in view of the longer production period slated for completion of the contract, one shift will be eliminated and the number of employes reduced from 2500 to 1400.

Chrysler to Build T-51 Next Year

Chrysler has officially confirmed that it will build the T-51 tank retriever (see AUTOMOTIVE INDUSTRIES, Nov. 1, p. 38) at the Chrysler Detroit tank plant starting next summer. The current contract for the T-51 amounts to approximately $48 million.

Work on the M-47 tank at the plant will be completed this month. During the interim period before T-51 production starts, the plant will do job shop work. Employment will drop from 3400 to 2400 persons after the M-47 job is completed.

Lead time for getting into the T-51 job has been set at eight months, considerably below the 12 to 18 months normally required. This is partly possible because many components used in the chassis are similar to those in the M-48 tank.

Fruehauf Group Buys Interest in D&C

A group headed by Roy Fruehauf, president of Fruehauf Trailer Co., has acquired a 15 per cent stock interest in Detroit & Cleveland Navigation Co. D & C operates as an investment firm and also controls Denver Chicago Trucking Co.

News of the AUTOMOTIVE



SUPERSONIC SKYBIRD

This dramatic flight photo of the Air Force North American F-100 Super Sabre Fighter (see AUTOMOTIVE INDUSTRIES, Nov. 1, p. 33) shows clearly the 45-deg sweep of the wing and tail. The craft is 45 ft long, 14 ft high, and has a wing span of 36 ft. Among the special features which contribute to supersonic speed are the extensive use of titanium and low-drag fuselage and canopy.

1953 Seen as Second Best Production Year as Vehicle Makers Go Into Final Weeks

The automobile industry already has secured 1953 as the third best production year in history for motor vehicles, and by the first of December should be in second place. Its output of 6.4 million vehicles in the first ten months of this year stood only 365,000 below the second best year, 1951. Even though November production will drop below that of October, the industry should go into December with more than the 6.765 million turned out in 1951.

In passenger cars, the industry on Nov. 1 already had piled up the second highest total in history with 5.37 million, second only to the 6.665 million total of 1950, with two months still to go. Production of passenger cars this year should exceed six million without any difficulty and probably will be somewhere in the neighborhood between 6.1 million and 6.2 million.

Trucks, on the other hand, will be nowhere near a record and probably will wind up the year in fifth or sixth position so far as all-time output is concerned. The first ten months accounted for about 1.034 million and, at the current rate of production, probably no more than 180,000 will be added to that total. This would give a 1953 total of approximately 1.215 million, about the same as that of 1952, but behind four other years —1947, 1948, 1950, and 1951.

Despite the passenger car total this year falling about 500,000 units short of the all-time high set in 1950, one of the Big Three probably will exceed any previous year. Another will mark up its highest postwar year, and a third will come close to beating any previous production year.

Ford, with two months to go on Nov. 1, needed only about 177,000 units to surpass its previous postwar year of 1.187 million units in 1950 and should make it without much difficulty. It will still be far short, however, of its all-time record of more than 1.8 million in 1923.

Plymouth needs fewer than 55,000 cars to surpass its previous record of 621,000 units turned out in 1951. With output running about 13,000 a week, Plymouth should hang up a new record year's production about the first week in December.

Chevrolet on Nov. 1 needed more than 200,000 units to beat its previous top year of 1.52 million, established in 1950. Due to model changeover, the division may not equal its previous record, but it certainly will not be far off.

Vapor Seal Discarded On New Ford Plants

As a result of its own tests on roof construction, Ford has eliminated the standard vapor seal from specifications on five new plants either already under construction or to be started soon.

At a cost of $10,000, Ford erected two test buildings. The roof of one building included a vapor barrier consisting of two layers of roofing felt attached to the decking with asphalt pitch between the decking and the insulating material. The other roof contained no vapor barrier.

The 20-ft by 40-ft buildings were fired by means of special oil burners operating under air pressure which raised the temperature to 1500 deg. Within a few minutes, the vapor-sealed roof was ablaze, emitting dense clouds of black smoke and dribbling burning rivulets of pitch into the building.

Under identical conditions, the roof without vapor seal reportedly withstood the test much better. Most of the flame came from burning paint on the steel work, but there was no apparent evidence of any of the upper layers of roofing tar running down into the building.

Conclusion of Ford engineers is that the protection against corrosion of the steel decking by use of a vapor seal is of less significance than the fire hazard created by the material used. The principal problem now is obtaining proper adhesives for bonding the insulating material directly to the steel decking. Ford has asked suppliers to develop an adhesive that will have good sticking qualities and also be resistant to moisture and fire.

Convair F-102 Makes Successful Flight

The successful flight test of the delta-wing, supersonic, all-weather fighter, the Convair F-102, was announced recently by the Air Force. The first flight was accomplished at the Air Force Flight Test Center, Edwards Air Force Base, Calif. Capable of supersonic speeds in straight and level flight, the single-place F-102 is powered by the Pratt & Whitney J-57 turbojet engine.

AND AVIATION INDUSTRIES

GM Nine-Months Sales Exceed Any Prior Year

Predictions by Harlow H. Curtice, General Motors president, last January that GM sales would total $9 billion this year appear to be well founded. For the first nine months of 1953, sales totaled more than $7.93 billion, 43 per cent above the same period a year ago and substantially higher than for any previous full calendar year.

Earnings for the period totaled more than $452.7 million and represented a return of 5.7 per cent of sales. Sales of defense products accounted for 18 per cent of the total, an increase of 36 per cent over the same period a year ago.

Taxes again accounted for a staggering total under the excess profit tax structure. General Motors paid $1.006 billion in total taxes in the period, or substantially more than twice its net earnings.

An interesting aspect of the report is that in the third quarter, during which the Hydra-Matic plant was destroyed by fire to curtail production at four divisions, GM still produced more than twice as many passenger cars as in the same period a year ago. Unit sales of vehicles produced in U. S. and Canadian plants during the third quarter were 84 per cent above the same period a year ago, and only 15 per cent below the all-time record established during the second quarter of this year.

The report also reveals that production of Hydra-Matic transmissions at the Riopelle plant in Detroit will be up to 1200 units a day this month. Output is scheduled to start at Willow Run soon and full-scale production achieved before the end of this year.

Fairchild Renews Deal with Fokker Aircraft

Renewal of licensing agreements with Fokker Aircraft interests has been announced today by Fairchild Engine and Airplane Corp.

The company is said to be very much interested in a turboprop version of the Fokker F-27, a DC-3 replacement. The aircraft is designed to take either reciprocating or the turboprop engines.



COSMOPOLITAN CHRYSLER

The GS-1, latest version of the Chrysler "Special" sports coupe, made its debut recently at the Paris International Automobile Show. Designed by Chrysler Corp. engineers in Detroit and built by Ghia in Turin, Italy, it features a number of design improvements and modifications over earlier "Special" models. Body changes include the addition of American-style front and rear bumpers, and a V-shaped molding which is carried forward along each side as a continuation of the rear fender line. Separate turn indicator lights have been added, and the front grille is re-styled. The GS-1 is built on the Chrysler New Yorker chassis with a wheelbase of 125½ in. and is powered by the Chrysler V-8 FirePower engine.

Studebaker Earnings Dip from Year Ago

Production difficulties earlier this year are reflected in the earnings statement for nine months reported by Studebaker. Earnings for the first three quarters of this year totaled more than $4.17 million, compared with nearly $9.3 million in the same period a year ago. Another contributing factor to the drop in earnings this year was the heavy amortization of tooling costs for the company's new line of cars introduced this year.

Industry Denies High Horsepower Hazardous

With the trend toward higher horsepowers continuing into 1954 models, safety organizations and some state officials again will be talking about the dangers of high speed brought on by the increase in power. However, many state officials are in agreement with the automobile industry that higher horsepower does not necessarily mean higher top speed or a greater driving hazard. In fact, they go along with the industry's viewpoint that more power under the hood actually is a safety factor. Performance is increased in the lower speed ranges, and the car is made more responsive when quick acceleration is required in an emergency to avoid an accident.

Charles A. Chayne, GM vice-president of engineering, made a telling point in the above connection before the American Association of Motor Vehicle Administrators recently. He cited the very high speeds possible with European cars of relatively low horsepower.

McCuen Accident Car Gas-Turbine-Powered

Reliable reports indicate that the experimental car being driven by C. L. McCuen, GM vice-president in charge of research, when he crashed through a guard rail at the GM proving ground recently, was powered by a gas turbine. GM is known to have such a car, and one of its top turbine research men was at the track at the time.

Chrysler Denies Early 1954 Model Change

Reports that Chrysler Corp. will bring out its 1955 models next May appear unfounded. According to top management sources, there is no possibility of having new models ready anywhere near that early in the year.

News of the AUTOMOTIVE

Merger Reports Continue to Gain in Tempo; Hudson-Nash Deal May Be First

Reports of mergers and combinations are more numerous now in the automobile industry than at any time since the war. Nash and Hudson are thought to be continuing their discussions on either an outright merger or combining of operations. In addition, there are other reports afloat, although none of them have been found to have any substantial basis.

The most interesting of the rumors involves three of the independents, plus a large independent automotive parts supplier. Another possibility being discussed is formation of a separate corporation which would integrate engineering and research, possibly some manufacturing of common components, and also purchases of basic materials and standardized components for independent companies to achieve the economies of large scale buying.

At the moment it appears that the Hudson-Nash deal is the one most likely to materialize first, although there is no certainty that the two companies can get together. However, the discussion has been going on for some considerable time and an answer one way or the other should be forthcoming before too long.

In the above connection, it is interesting to note the recent statement by George W. Mason, Nash president, that merger is not necessary for the survival of independent automobile companies. He pointed out that Nash is one of four independents who have been in business for more than 50 years and have survived two major depressions and two world wars. Mr. Mason also emphasized the fact that Nash is now in a very strong position from the point of view of both facilities and financial assets.

Studebaker currently reports that it has no merger activity under way and is inclined to view such a possibility as rather unlikely. Paul G. Hoffman, board chairman, said recently, however, that Studebaker has not closed the door on any advantageous propostion that might be presented and that, under the right circumstances, might either buy or sell.

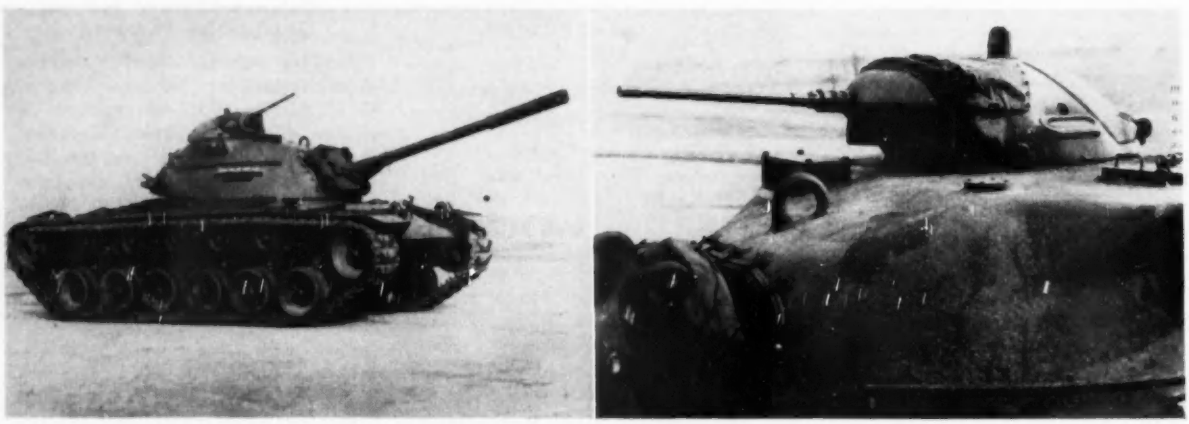
There has been a definite trend toward integration over the past couple of years, particularly in the truck field. White has absorbed Sterling and Autocar; Federal has merged with Fawick Corporation of Cleveland into Federal-Fawick Corp.; and General Motors has acqured Euclid. Reo has diversified its activities by branching out into other fields, such as the manufacture of lawn mowers and wheeled toys.

Of course, in the passenger car field, there is the recent merger of Kaiser and Willys, and the outright acquisition of Briggs by Chrysler. Since the industry next year is looking for a market of approximately 5½ million automobiles, although demonstrated capacity is far in excess of that figure, competition for percentage of market is going to be brutal, not only next year but in the foreseeable future.

Consequently, cost advantages inherent in company size and volume are again going to come into play more significantly than at any time since the prewar days.

Tractor Imports Indicate Mechanization in Mexico

Mechanization of Mexico's agriculture is particularly evident in the heavy increase in the imports of tractors. According to figures released by the Bureau of Statistics of the Department of National Economy, whereas only 352 tractors were imported in 1934, there were 2788 tractors imported in 1945. Figures for subsequent years as follows: 1946—2972; 1947—4846; 1948—6894; 1949—5196; 1950—6370; and 1951—9758.



TANK CREW LIFE PRESERVER

The Detroit Arsenal has announced development of a new turret-type machine gun mount specifically designed for use on the M-48 medium tank. It will become a part of the tanks now being manufactured by Ford, Fisher Body, and Chrysler. The mount provides for all-round battlefield surveillance aiming, firing, clearing jams, reloading, etc., without requiring the commander to expose himself.

AND AVIATION INDUSTRIES

New Headlamp Approved By State Officials

The American Association of Motor Vehicle Administrators has approved a new type of headlamp developed cooperatively by the automobile and electrical industries. It is said to give better illumination on lower beam operation, better visibility in rain and snow, improved anti-glare characteristics, particularly at close range, and to throw more light to the right-hand side of the highway. It is expected that necessary changes in state laws will be obtained without difficulty and that the new lamp can be tooled for production in time for introduction on 1955 models.

The administrators also approved a standardized size (six in. by 12 in. outside dimensions) for license plates, a project long sought by the automobile industry. This will permit designers to make provisions for such features as recessing the license plate or putting it behind glass. It also will be possible to provide mounting holes for the license plate, so that the threaded fastenings can be located inside the trunk compartment where they are safer from theft and protected from corrosion.

Hudson Loses Part of Defense Work

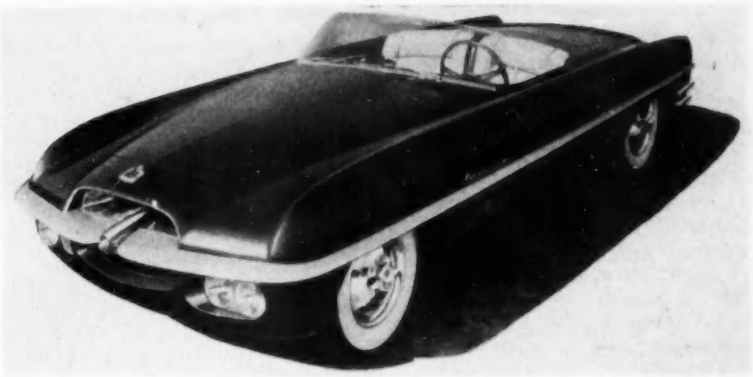
Hudson has lost part of its defense work with the transfer of aircraft work on nose sections to Boeing, for which Hudson was a subcontractor. Transfer of the work will take place over the next several months. Other Hudson defense work, however, will continue without change for the time being.

Post Office Testing Willys Mail Vans

The Post Office Dept. is testing four special parcel post delivery trucks produced by Willys Motors, Inc., in four metropolitan points. Principal objective is to determine whether the lighter weight units can effect enough operating economies to warrant replacment of heavier equipment currently in use.

Built on standard 104-in. wheelbase Willys truck chassis, the vehicles have more than 120 cu ft of cargo space, a van type body with sliding doors on both sides, and are powered by a Willys Six F-head engine.

Two of the test models are equipped with right-hand drive to facilitate pickups from the curb. Willys already has an order from the Post Office Dept. for sedan delivery vehicles. These vehicles also are right-hand drive and use either the four-or six-cyl F-head engine.



DODGE SPECIAL SPORTSTER

Built on a 115-in. wheelbase, the new Dodge Firearrow sports car is an experiment in body styling. It was hand-crafted by Ghia of Turin, Italy, is only 34-in. high., and has an overall width of 75½ in. The company states that although certain design and engineering features of the car may be reflected in future production models, there are no present plans to manufacture the Firearrow.

1953 U. S. PASSENGER CAR PRODUCTION

(As reported by the car factories)

	October 1953	September 1953	October 1952	Ten Months 1953	Ten Months 1952
Chrysler	12,357	4,354	11,210	137,813	92,196
De Soto	7,716	5,636	5,708	108,128	74,282
Dodge	25,918	16,313	21,574	259,908	193,891
Plymouth	67,641	40,268	30,565	565,170	363,464
Total—Chrysler Group	113,632	66,571	69,054	1,071,019	723,832
Ford	132,115	126,120	103,824	1,011,495	620,303
Lincoln	None	287	1,732	35,156	26,711
Mercury	36,608	36,432	23,042	269,594	149,760
Total—Ford Group	168,723	162,839	128,598	1,316,245	796,774
Buick	41,792	40,846	35,642	453,827	272,782
Cadillac	7,095	3,984	10,868	88,742	64,692
Chevrolet	132,955	128,787	114,135	1,312,029	740,576
Oldsmobile	14,408	12,289	26,896	284,487	193,922
Pontiac	31,343	26,427	32,843	362,277	234,241
Total—G. M. Group	227,593	213,333	220,184	2,502,362	1,526,193
Henry J and Kaiser	None	None	8,812	19,804	59,428
Willys	2,288	3,286	5,340	40,186	40,973
Total—Kaiser Group	2,288	3,286	13,952	59,990	100,401
Hudson	4,150	4,296	3,710	85,982	64,681
Nash	7,699	4,682	18,875	119,748	120,723
Packard	446	3,228	4,433	75,225	48,688
Studebaker	5,437	13,636	21,132	160,315	132,168
Total—All Makes	529,968	471,871	479,938	5,370,686	3,513,442

News of the AUTOMOTIVE

Magnesium Association Meeting Emphasizes Extended Commercial Applications of Light Metal

The Ninth Annual Meeting of the Magnesium Association, held in New York City, Nov. 2 and 3, took place in an atmosphere that bespoke an increasing consciousness of the necessity for developing more commercial applications for the light metal. While it is true that magnesium has been meeting a growing acceptance for industrial applications, particularly in the automotive and aviation industries, the fact remains that a large portion of the nation's production has been called upon to fulfill military requirements.

Obviously, the day will come when military needs will fall off drastically, and the magnesium industry then will be compelled to divert more of its production into commercial channels. Ways and means to accomplish this end in stressing the advantages of magnesium for certain applications that would offset the persistent cost problem were among the prime topics explored at the meeting.

Die Castings

In an interesting paper on "Magnesium Die Castings," G. F. Hodgson of Doehler-Jarvis Corp. pointed out that there have been extraordinary gains made in broadening the range of their applications in the past few years. Aside from the advantageous properties of magnesium itself, he stated that a great improvement in both price and availability has been responsible for these strides.

In reviewing the expanding applications of magnesium die castings, Mr. Hodgson went on to say that the automobile industry is today the largest single consumer of die castings and accounts for over one half of their consumption. After listing a number of familiar automotive decorative and semi-structural parts in which magnesium die castings are currently being used, he predicted that in the future they will be found entirely satisfactory for such other parts as transmission extensions, clutch housings, converter housings, automatic transmission valve castings, etc.

Other Papers

An enlightening paper on the problems encountered in "Designing Magnesium Products" and possible solutions, by W. Z. Jarmicki, Light Alloys, Ltd., was followed by one from Paul E. Wolfe, Heli-Coil Corp., on "Performance Data: Stainless Steel Wire Screw Thread Inserts in Magnesium Applications." In it were stressed a number of automotive, aircraft, and military applications of these inserts.

Douglas A. Tooley, Consolidated Vultee Aircraft Corp., chose as his subject "Use of Metal Adhesives with Magnesium." Most of his paper was devoted to a discussion of the application of Metlbond adhesive to B-36 bomber assemblies. In the concluding section, however, he touched briefly upon other metal adhesives such as Redux, a material developed in England and currently being used by Chance Vought.

The technical sessions were concluded with a paper on "Finishing Systems for Magnesium" by Hugo Barbian, Dow Chemical Co., and one on "Magnesium Alloy Back Extrusions," by C. Ridgely Kemp, Magnesium Co. of America. A side note of interest was the announcement by Dow Chemical Co. of the initial operation of the high-speed, high-production rolling mill at its Madison, Ill., plant.

Magnesium Fuel

At a special press conference held in conjunction with the meeting, Dr. Joseph A. Scharen, Technical Director of Reade Manufacturing Co., Lakehurst, N. J., revealed that his firm has reportedly developed a magnesium fuel composed of 95 per cent magnesium in powdered form with a five per cent stabilizing agent. It is claimed that one pound of the fuel yields power equal to that provided by 10 gal of gasoline and that it has been developed with a particular eye to weight-saving aircraft applications.

Reade is said to have developed a radically new type of engine for use of the fuel, although it allegedly can be used in existing types of engines with modifications. Dr. Scharen would not reveal any details of the engine, since no patents have been applied for as yet, other than to say that it had a spark ignition. The powdered magnesium used in the fuel is ground down to six microns.

1953 MOTOR VEHICLE FACTORY SALES*

	Passenger Cars	Trucks	Buses	Totals 1953	Totals 1952
January	453,319	111,599	254	565,172	375,410
February	486,071	96,740	190	583,001	435,216
March	568,320	134,129	236	700,685	482,973
April	596,633	126,754	145	723,532	529,565
May	549,677	93,443	367	643,487	503,917
June	587,549	74,063	380	661,992	518,710
July	599,134	105,622	376	705,132	211,782
August	513,457	101,478	447	615,382	270,982
September	475,289	98,051	348	573,688	551,159
Total—Nine Months	4,827,449	941,879	2,743	5,772,071	3,879,734

1953 MOTOR TRUCK FACTORY SALES BY G.V.W.*

	5,000 lb. and less	5,001-10,000	10,001-14,000	14,001-16,000	16,001-19,500	19,501-26,000	Over 26,000	Total
January	53,077	21,481	4,087	16,333	3,953	8,766	3,905	111,599
February	45,121	18,279	3,413	13,305	4,287	8,255	4,080	96,740
March	59,951	25,153	6,159	22,962	5,618	9,503	4,783	134,129
April	55,652	25,660	5,770	21,005	5,187	8,856	4,604	126,754
May	43,812	16,293	3,580	13,379	4,823	7,900	3,656	93,443
June	33,297	11,628	2,169	10,102	4,549	8,217	4,101	74,063
July	51,318	18,697	4,220	15,768	4,231	7,635	3,753	105,622
August	47,884	18,611	4,241	15,599	3,850	8,930	4,363	101,478
September	49,159	18,000	3,610	14,390	3,508	5,163	4,221	98,051
Total—9 Mos., 1953	439,271	173,822	37,249	142,843	40,003	71,225	37,466	941,879
Total—9 Mos., 1952	329,380	164,598	42,561	163,708	38,651	79,424	35,084	850,406

*—Automobile Manufacturers Association.

AND AVIATION INDUSTRIES

Army Tests Packard Diesel for Tank

In line with its policy of testing various types of engines for military vehicle use, Army Ordnance is planning to install a 12-cyl Diesel engine made by Packard in an M-48 tank. Currently, a contract involving $2[illegible],000 is being negotiated between Packard and Ordnance to cover the research project.

The Packard Diesel weighs 3300 lb and develops 600 hp. The Army is now using a Continental aircooled gasoline engine developing 810 hp and weighing 2400 lb on the M-48.

The Packard Diesel also is involved in a Navy project to build a nonmagnetic plastic mine sweeper. The six-cyl Diesel would develop 300 hp, and due to its high percentage of aluminum, is considered practically non-magnetic, an important feature to prevent detonation of magnetic mines. Weight of the engine is about 2200 lb.

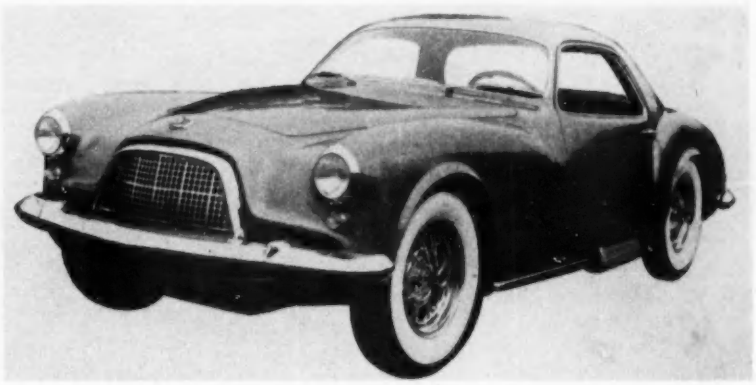
Cadillac Reveals Tank Cost Cut

Cadillac has revealed some interesting figures on tank production costs at its Cleveland plant. Initially, production time was 3087 man-hours per tank, but this now has been reduced to 1719 man-hours, with the cost cut down to about $100,000 from the $300,000 original cost.

H. R. Boyer, manager of the plant, refuted reports that the operation was being prepared for suspension in stating that a backlog of 16 to 18 months' work is on the books. He emphasized that the plant is not a dual-purpose unit and would be difficult to operate for making automobiles or other civilian products.

Ford Forms Advanced Body Study Group

Ford has formed a special projects group within its engineering staff for research in the field of advanced body design. It will be headed by J. C. Widman, body engineer-special projects. William Bobek will succeed Mr. Widman as Ford car body engineer at Ford engineering staff.



DE SOTO SPORTS COUPE

The DeSoto Adventurer, another member of Chrysler Corp.'s family of new experimental cars, is a four-passenger sports coupe designed in Detroit. The body, built on a modified DeSoto chassis, was hand-crafted by Ghia of Turin, Italy. The car has a wheelbase of 111 in., is only 53 in. high, and is powered by a Firedome V-8 engine.

Sixes to Continue Despite V-8 Trend

There is no denying the V-8 trend, but sixes still will be around for a long time yet. Ford will increase output of sixes in the months ahead. Chevrolet gets its new V-8 engine some time next year but undoubtedly still will have sixes in its line, and the same is expected for Plymouth, if and when it goes to a V-8, as now seems likely.

Chrysler Div. Cuts 1954 Model Prices

Chrysler Div. has reduced prices up to $169 on some of its 1954 models. Price adjustments reflect the inclusion of PowerFlite automatic drive as standard equipment on some models.

The price reduction is the second this year. Last March, when Chrysler Corp. reduced prices an average of $100 on all of its lines, Chrysler Div. price cuts ranged up to $225.

Hudson Only Company To Drop Hydra-Matic

Hudson is apparently the only company to abandon Hydra-Matic because of the GM plant fire. Hudson has adopted the Borg-Warner drive, but Nash, Kaiser and Lincoln are staying with Hydra-Matic. Lincoln, however, is said to be working on an automatic transmission of its own, probably a larger version of the current Merc-O-Matic.

Shipments of U. S. Steel Hit Record in Period

U. S. Steel Corp. has reported an income for the first nine months of 1953 of $166,723,028 compared with $96,158,606 for the first nine months of 1952. Shipments for the first nine months of 1953 totaled 18,951,123 net tons, an all-time record for any such period.

Curtiss-Wright Awarded Extrusion Press Right

A new airplane propeller manufacturing operation in Buffalo was clinched recently when the Air Force awarded the Curtiss-Wright Corp. a contract to operate one of six giant extrusion presses for mass production of aircraft parts.

Construction of a plant to house the press is nearly completed. Operation of the press is scheduled to begin next summer or fall.

Continued on Page 80

Precision in mass production



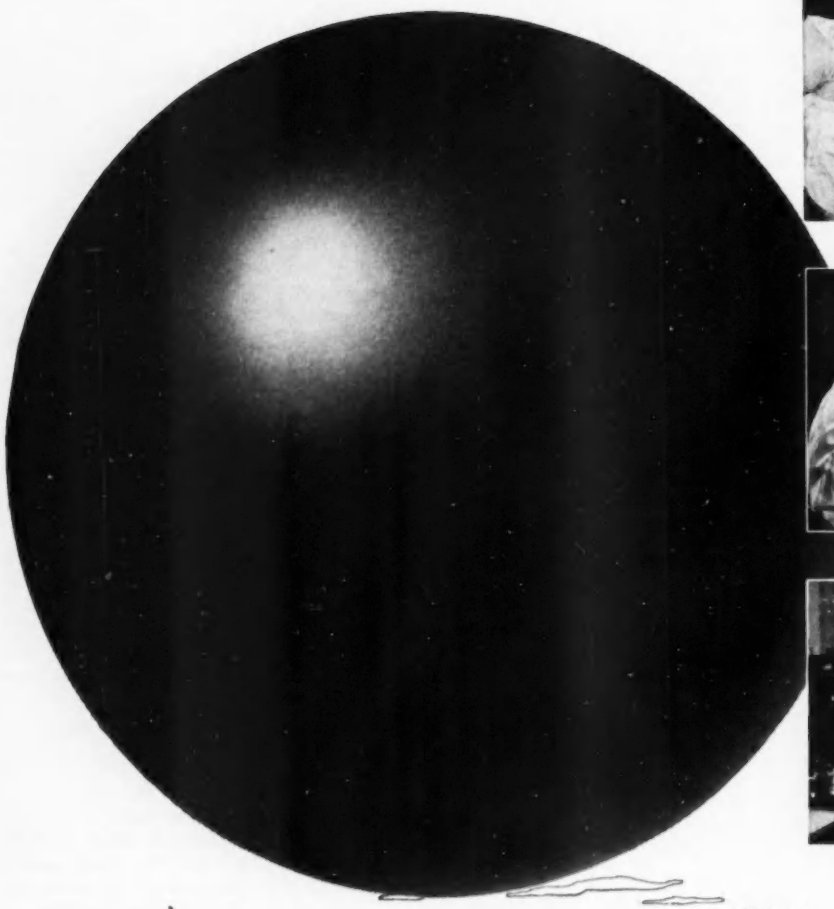
Miniature bearings are gauged and classified to meet various tolerance specifications.



Visual check under magnification . . . one of many exacting inspections.



Ultrasensitive torque testers measure starting characteristics of low torque bearings.





To keep pace with the ever increasing requirements of modern instrumentation, New Departure has greatly multiplied its miniature bearing production . . . built the nation's most modern facilities at Sandusky, Ohio.

Here is careful craftsmanship, infinite inspection, perfection in precision, on a mass production scale never before achieved. Here are the latest machine tools, the most advanced testing and inspection devices, many of which had to be specially designed by New Departure.

For a personal introduction to these fine new facilities, send for your free copy of our new fully illustrated booklet on New Departure instrument bearings.

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BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio

Men in the News



Cadillac Motor Car Div., General Motors Corp.—C. H. Smith has been made special assistant to the general manager, while Alexander F. Swetish succeeds him as divisional comptroller.

Buick-Oldsmobile-Pontiac Div., General Motors Corp.—**E. L. Christopher** has been appointed production manager, while **C. A. Kolosseus** is now plant engineer at the Southern California plant.

United Steel Products Corp.—**Irving B. Pike** is now sales manager.

Lockheed Aircraft Corp.—**R. I. Mitchell** was appointed assistant contracts manager for the Marietta, Ga., section.

Reliance Electric and Engineering Co.—**Paul W. Arnold** has become manager of marketing services, while **Charles H. Sutherland** has been made assistant chief engineer.

Clevite Corp.—**Dr. T. Keith Glennan** was elected to the board of directors.

Westinghouse Electric Corp.—**William A. Patterson** has been elected to the board of directors.

Norton Co.—**Edward Van der Pyl**, director of equipment engineering, has retired.

Ford Tractor Div., Ford Motor Co.—**James F. Pedder** has become assistant general sales manager (advertising, sales promotion, and dealer development); **Russell B. Robbins**, assistant general sales manager (field activities); and **David Meeker**, assistant general sales manager (product sales and service).



Dodge Div., Chrysler Corp.—Clark A. Templeton and E. P. Letscher are now assistant sales managers.

Continental Aviation & Engineering Corp., Aviation Gas Turbine Div.—**Marvin A. Bennett** has been chosen assistant manager.

LeTourneau-Westinghouse Co.—**E. W. Spannhake** has been appointed director of research and engineering.

Elwell-Parker Electric Co.—**William H. Campbell** has been elected treasurer and assistant secretary.

All-State Welding Alloys Co.—**Thomas D. Nast** has been selected as president.

Viking Copper Tube Co.—**Frank W. Jamieson** has been elected secretary.

Plymouth Motor Corp.—R. A. McCaroll is now master mechanic at the main Detroit plant.

Dodge Div., Chrysler Corp.—**Gordon W. Crane** has been appointed regional merchandising manager for the Detroit region.

Timken-Detroit Axle Div., Rockwell Spring and Axle Co.—C. C. Bartell has been made vice-president in charge of axle sales and related equipment; **R. M. Hays**, vice-president in charge of trailer axle activities; **W. W. Joyce, Jr.**, manager of market research; and **U. R. Gress**, assistant manager of trailer axles.

Kaiser-Willys Sales Div., Willys Motors, Inc.—**J. W. Alexander** has been named general service manager.



National Machine & Tool Co.—Robert E. Hall has been promoted to general manager and Russell J. Veldman succeeds him as sales manager.



Dana Corp., Service Div.—Neil A. Moore has been made general manager for Spicer products.

(*Turn to page* 152, *please*)

Necrology

W. Earle Shumay, manager of sales engineering, Norton Co., died Oct. 25, at Worcester, Mass.

Harold B. Thomas, a founder of Elastic Stop Nut Corp. and former chairman of the board of Norma Hoffman Bearings Co., died Oct. 23, at Orange, N. J.

Lyle C. Moore, 45, assistant manager of the Ford standard transmission and radiator plant, was killed in an automobile accident Oct. 26, near Mackinaw City, Mich.

Ernest Anheuser, 64, president of Anheuser File Co., was killed in an automobile accident Oct. 21, near Ashippun, Wis.

Ray A. DeVlieg, 67, former vice-president in charge of manufacturing for Nash-Kelvinator Corp., died Oct. 15, at Detroit, Mich.

Pol Ravigneaux, 80, one-time chief engineer of De Dion Bouton Co., died Oct. 11 at Paris, France.

Arthur R. Blood, 62, chief of design work on gasoline engines at the Milwaukee plant of Allis-Chalmers Manufacturing Co., died Oct. 1, at Milwaukee, Wis.



AC Spark Plug Div., General Motors Corp.—Joseph A. Anderson has been appointed general manager.



Lamb Electric Co.—Clyde F. Curtis has joined the company as assistant to the president.



Your wet clutch may need a custom-compounded facing

A well-designed clutch may lose a lot of its inherent performance if the torque-engagement characteristics of its facing don't precisely fit its mechanical characteristics. That's why your wet clutch may need a facing material that's compounded to supply a particular combination of properties.

Of course, one of Armstrong's many standard friction materials may be exactly what you need. But if you need something special, Armstrong can supply it with a minimum of time and effort on your part.

You merely give us the pertinent data on your clutch design—which you can do easily on one of our Clutch Data Sheets. Then we will give you a selection of facings that seem most suitable, either in cork or combinations of cork and rubber, or cork and fiber.

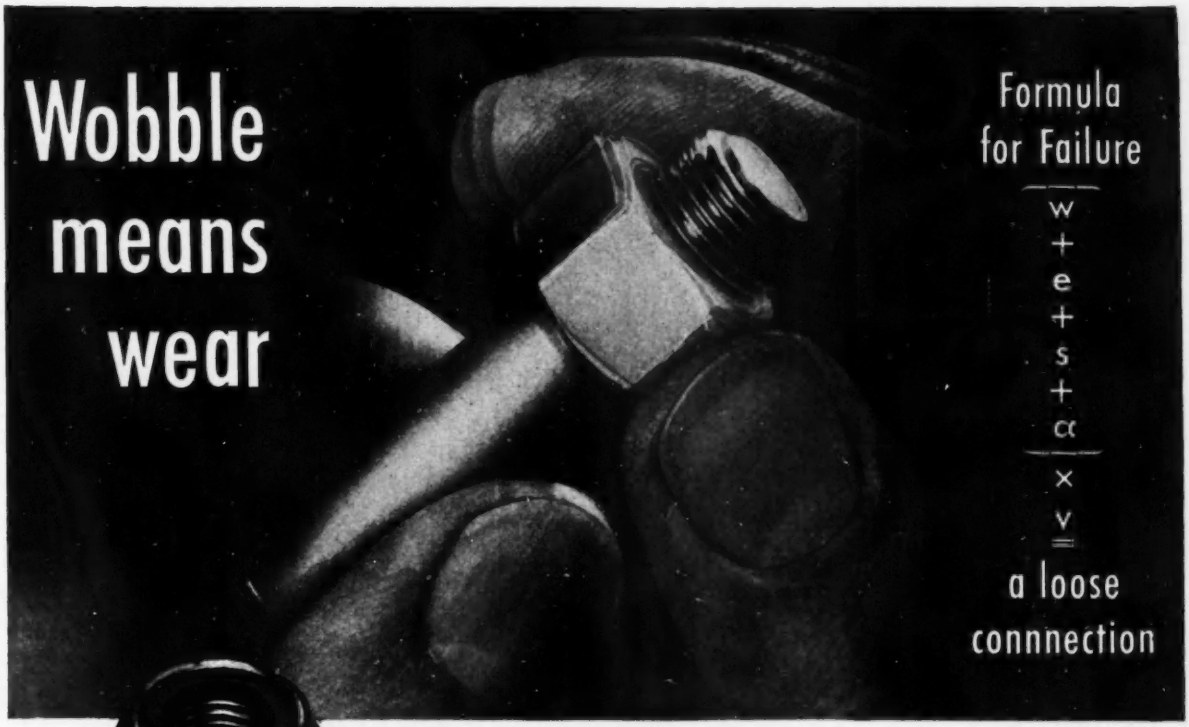
If your field tests show that none of these materials gives you the performance you're looking for, and very often one will, then your test data can be used by Armstrong compounders either to modify an existing compound or create an entirely new one. Here's how they do it.

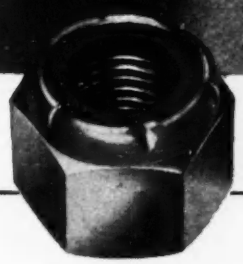
All Armstrong's Friction Materials are performance-tested under standard, controlled conditions on special, Armstrong-built test equipment. Your test data on the most promising of the facings are compared with the laboratory data on that same material. This comparison shows how it may need to be modified or which other Armstrong material may already offer the properties you need.

If a compound modification or a new compound is called for, Armstrong compounders ordinarily can come up with it quickly because their studies already have established what the effects are of many variations in formulation or operating condition. This has a double advantage for you. You can get a suitable facing with a minimum of experimental time and expense. You also have assurance that the material you select will do the best possible job in your particular clutch.

If you're working on a new clutch design now, or would like to improve the performance of an existing unit, write for a copy of our Clutch Facing Data Sheet. We'll be glad to study the data you submit, suggest suitable materials, and supply samples for experimental use. Write Armstrong Cork Company, Industrial Division, 7211 Imperial Avenue, Lancaster, Pennsylvania.

ARMSTRONG'S FRICTION MATERIALS





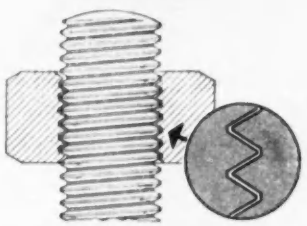
Elastic Stop nuts can't wobble

Formula for Failure—[(w) Initial thread wear + (e) bolt stretch + (s) thermal expansion or contraction + (α) wobble] × (v) vibration = a loose connection.

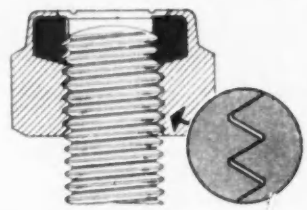
WOBBLE, permitted by normal axial thread play, and vibration are two of the major elements contributing to thread wear, loose connections and ultimate failure of a threaded fastener.

One device — the elastic locking insert — eliminates axial play and dampens destructive, wear-producing vibration. Because of the locking action of ESNA's famous red elastic collar, ELASTIC STOP nuts *do not loosen under vibration.*

Other important ESNA advantages include quick application and precise adjustment, reuseability, protection against liquid seepage, and uniform bolt loading. Mail our coupon for design information.



YOU CAN WOBBLE AN ORDINARY NUT AND BOLT with your fingers. This is the result of the tolerance spread permitted by the several classes of thread fit.



GRIPPING THE BOLT WITH A PERFECT FIT, ESNA's red elastic collar enforces a constant downward pressure that eliminates axial play, enforcing a positive contact between load-carrying sides of bolt and nut threads.

ELASTIC STOP NUT CORPORATION OF AMERICA
also maker of the ROLLPIN

Elastic Stop Nut Corporation of America
Dept. N3e-115, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Street _____

City _____ Zone _____ State _____


HIGH TENSILE

ANCHOR

HIGH TEMPERATURE

SPLINE

CLINCH

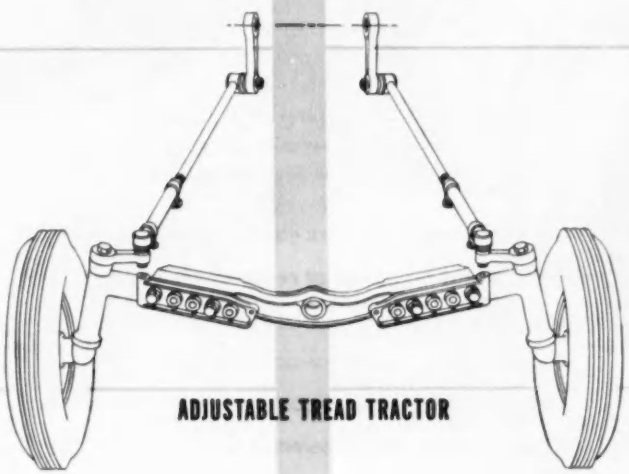
GANG CHANNEL

NYLON CAP

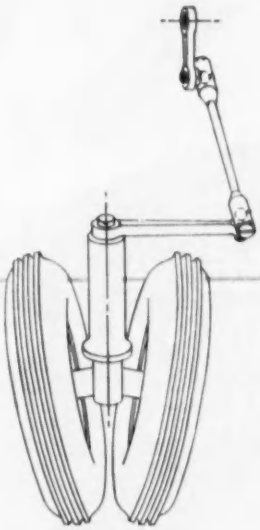
Only ESNA manufactures a complete line of all types and sizes of self-locking nuts


LIMITLESS HORIZONS IN SPRING DESIGN
Any 10 SOURCES for Mechanical Springs
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Engineered Steering for Tractors



ADJUSTABLE TREAD TRACTOR



TRICYCLE TYPE TRACTOR



CENTER ARM STEER
Adjustable Tread Tractor

STEERING LINKAGE must be developed to meet the requirements of many different tractor designs. Thompson's "Steering Engineers" have worked closely with tractor builders for many years to improve steering.

With the accent on easy steering, design advances, maneuverability and increased loads on the suspension and linkage; steering linkage units are required to provide more strength and accuracy and greater freedom of movement at the sockets.

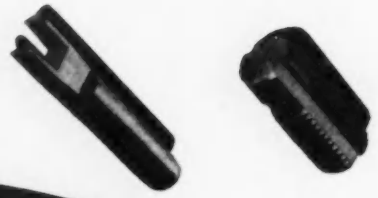
Improvements in modern tractors—requirements by many tractor manufacturers for improved steering to accommodate adjustable front wheel tread for planting and cultivating certain types of farm products—necessitated better and far more complicated steering units.

Illustrated are 3 of the types of steering linkage found on current-model tractors. Thompson Products makes a wide variety of such parts. For consultation on these designs or other steering problems, please contact us.

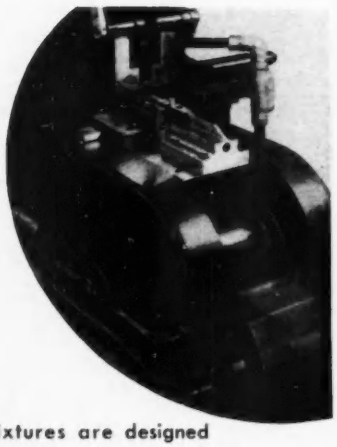
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machine faster
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• Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.

Many types of work can be surface broached on Footburt machines at remarkable savings over previous machining methods. High production is obtained with required accuracy and finish. Cutting tool maintenance costs are low. We will be glad to make our recommendations on Footburt Surface Broaching Machines based on our many years in handling similar work.

THE FOOTE-BURT COMPANY, Cleveland 8, Ohio
Detroit Office: General Motors Building



FOOTBURT
MACHINE TOOLS

SEALED TO ORDER BY VICTOR



MODEL "60" SERIES ENGINE

FEATURES VIC-2-FOLD SEALING

To the John Deere technical staff, the merits of VIC-2-FOLD cylinder head sealing were readily apparent. Here is the modern development of metal-asbestos gasket structure. The best characteristics of copper, steel, and asbestos are fully utilized. VIC-2-FOLD can be made as thin as needed, yet with adequate compressibility for positive sealing. Strength and durability are increased by this Victor construction.

Sealed by Victor Means Satisfaction

Take a close look at VIC-2-FOLD design, at right, as did John Deere engineers. Here, or in the complete Victor line may be a far better value in automotive sealing products than you're now getting. Your inquiry invited; no obligation.

VIC-2-FOLD

. . . THE MODERN METAL-ASBESTOS CYLINDER HEAD GASKET

Note how the high strength of steel is utilized in the bottom layer. Combustion openings are turned up, overlapping top copper layer, giving strong protection against breakdown and blowout.

In coolant openings, copper top layer is formed down, utilizing copper's higher resistance to corrosion in contact with coolants and anti-freeze solutions.

Compressibility of VIC-2-FOLD gaskets is precisely controlled by the use of finest long fiber asbestos millboard, milled in Victor's own plant.

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VICTOR GASKETS AND OIL SEALS

VICTOR

"ORIGINAL EQUIPMENT"

Gaskets and Oil Seals

SEALING PRODUCTS EXCLUSIVELY

1953 Vehicle Registrations Up 4.8 Per Cent

By Marcus Ainsworth

APPROXIMATELY 55 million vehicles will have been registered by the end of the 1953 registration year, an average of one vehicle for every 2.9 inhabitants of the United States and our armed forces overseas. In addition to these 55 million registered vehicles there will be in the neighborhood of 650,000 unregistered vehicles belonging to federal, state and local governments.

Actual 1953 registrations will approximate 54,942,888 as compared with 52,446,152 in 1952, a gain of 4.8 per cent. Of these totals 45,451,671 will be passenger cars and taxi cabs, an increase of about 5 per cent over the 43,323,355 registered during 1952. Trucks and buses combined will account for 9,491,217 or 4 per cent more than the 9,122,797 registered during the previous year. (*Turn to page* 140, *please*)

1953 Forecast of Motor Vehicle Registrations

As of the End of the 1953 Registration Year.

	Passenger Cars[1]		Trucks		Buses		Total Motor Vehicles		Per Cent Increase
	1953	1952	1953	1952	1953	1952	1953	1952	
Alabama	620,667	541,682	170,753	164,490	1,680	1,684	792,410	707,856	11.9
Arizona	266,226	249,729	75,900	72,059	850	779	342,575	322,563	6.2
Arkansas	343,750	333,450	148,000	140,193	3,400	3,343	515,150	496,986	3.7
California	4,460,000	4,166,623	765,000[4]	706,129	(2)	(2)	5,215,000	4,986,752	4.7
Colorado	491,412	476,137	149,272	138,333	(2)	(2)	621,684	614,470	1.2
Connecticut	723,295	651,132	100,270	93,754	3,178	2,843	826,752	747,729	10.6
Delaware	102,619	89,965	24,303	21,541	(2)	(2)	126,922	111,506	13.9
District of Columbia	176,000	179,912	18,500	20,073	2,150	2,147	196,650	202,132	−2.7
Florida	1,023,700	976,810	200,000	184,223	5,000	5,425	1,228,700	1,176,458	4.3
Georgia	845,000	796,880	225,000	213,748	6,500	6,062	1,076,500	1,016,648	5.7
Idaho	213,773	206,291	56,963	59,313	(2)	159[1]	270,726	277,763	0.7
Illinois	2,584,000	2,452,061	380,000	379,604	2,300	(2)	2,936,300	2,831,655	3.7
Indiana	1,319,263	1,257,519	267,190	253,362	7,670	7,489	1,594,129	1,518,370	5.0
Iowa	906,636	861,251	199,488	192,904	(2)	(2)	1,106,106	1,074,155	3.0
Kansas	729,791	696,163	233,979	224,348	(2)	(2)	963,770	920,531	4.7
Kentucky	697,000	662,886	158,000	181,706	(2)	(2)	855,000	844,303	4.8
Louisiana	664,000	595,613	167,500	160,205	4,000	3,953	775,500	755,771	2.6
Maine	229,425	220,131	65,550	64,437	825	681	295,550	285,229	3.6
Maryland	693,113	646,111	117,966	111,727	5,106	4,549	815,969	762,387	7.0
Massachusetts	1,235,000	1,191,783	167,000	159,796	5,010	7,936	1,407,010	1,359,457	2.7
Michigan	2,381,763	2,212,912	336,778[1]	315,738	(2)	(2)	2,718,542	2,528,650	7.5
Minnesota	1,035,000	977,679	214,000	205,601	3,900	3,956	1,252,900	1,186,936	5.6
Mississippi	363,276	342,066	170,256	163,332	5,700	5,751	539,232	511,143	5.5
Missouri	1,046,300	1,043,688	275,000	274,433	4,200	4,819	1,324,500	1,322,740	0.1
Montana	188,832	189,713	80,540	87,117	(2)	(2)	268,372	276,830	3.4
Nebraska	460,000	472,922	145,900	142,901	875	892	625,875	616,715	1.5
Nevada	77,340	70,380	23,000	20,894	(2)	(2)	100,340	91,254	10.0
New Hampshire	150,000	146,322	35,000	33,002	(2)	(2)	185,000	179,324	3.7
New Jersey	1,680,681	1,603,667	233,323	215,186	9,967[1]	10,026[1]	1,943,181	1,728,883	6.6
New Mexico	210,000	198,206	73,900	68,943	1,100	1,096	284,100	268,638	5.8
New York	3,563,000	3,479,978	466,500	474,988	19,950	16,758	4,049,450	3,969,724	.8
North Carolina	979,491	911,030	236,124	227,768	6,500	8,727	1,227,115	1,147,526	6.9
North Dakota	210,000	193,029	120,000	99,071	90	109	330,090	282,209	17.0
Ohio	2,725,000	2,610,000	370,000	360,000	(2)	7,990	3,095,000	2,977,000	3.9
Oklahoma	685,000	668,371	233,000	218,754	1,300	1,624	919,500	879,749	4.6
Oregon	650,000	638,451	88,000	96,922	1,625	1,619	739,625	724,752	2.1
Pennsylvania	2,919,124	2,794,861	512,053	507,981	12,599[1]	12,556[1]	3,442,777	3,304,992	4.2
Rhode Island	241,200	234,199	34,500	32,469	650	579	276,350	267,270	3.4
South Carolina	560,165	517,797	121,153	121,016	2,282	(2)	683,600	638,783	7.0
South Dakota	224,336	217,661	81,147	77,404	281	103	305,764	295,368	3.5
Tennessee	765,000	738,763	215,000	207,207	(2)	(2)	980,000	945,910	3.6
Texas*	2,810,000	2,472,840	661,000	661,925	4,900	5,148	3,301,900	3,139,911	5.2
Utah	231,563	216,874	52,907[1]	50,287[1]	405	432	284,900	267,593	6.5
Vermont	113,316	110,282	16,153	15,298	130	131	129,599	125,601	2.4
Virginia	878,000	834,053	192,000	184,779	2,900	(2)	1,072,900	1,018,862	5.2
Washington	838,189	795,737	175,061	169,052	1,915	1,906	1,015,875	966,695	5.1
West Virginia	410,000	381,998	116,000	112,754	1,000	1,039	527,000	495,791	6.3
Wisconsin	1,067,800	1,000,629	224,130	220,175	2,700	2,661	1,294,630	1,223,465	5.3
Wyoming	169,284	167,963	45,814	44,688	(2)	(2)	185,098	182,648	1.7
Total	45,451,671	43,323,355	9,389,311	8,988,589	131,806	134,237	54,942,888	52,446,152	4.8

1—Includes taxicabs. 2—Included with trucks. 3—Included with passenger cars. 4—Includes approximately 135,000 light trucks originally registered as passenger cars. *—Not comparable as 1953 data are on calendar year basis as against fiscal year for 1952.

Canadian-U.S. Production Engineers Discuss Mutual Problems

By James Montagnes

TORONTO, CANADA

ABOUT 600 engineers from manufacturing plants in the United States and Canada met for the First SAE International Production Meeting and Forum held at Toronto, October 29 and 30. Eight panel sessions were held the first day and three papers on aircraft production were given the morning of the second day, with two plant tours being arranged for the afternoon of the second day.

Canadian defense production, how it is progressing, international cooperation between the United States and Canada, methods for keeping the defense production line active, problems of accelerated depreciation on machine tools and Government aid in capital, expansion for defense were discussed by Reginald M. Brophy, deputy minister of defense production, Ottawa, at the Thursday evening dinner. He traced Canada's postwar defense role, dealt with plans for the immediate future, the cost of the program, purchases by Canada in the United States totaling $500 million and by the United States in Canada of $400 million on defense items. Canada has since 1950 placed orders for some $4 billion in aircraft, weapons, electronics and ships, and major production is still continuing on aircraft and electronics, with less on weapons and ships. Contracts since 1951 include a clause which requires the contracting manufacturer to maintain the tooling for a year after completion of the contract. Canadian Government warehouses are now under construction where defense plant tools will be maintained in working condition in cases where Government has loaned the tools to the factories.

All panel discussions dealt with problems on the international level, and at many the emphasis was on what Canadian plants were doing to meet conditions brought about by smaller production than in the United States but requiring tooling for United States model equipment being made in Canada. This was especially true of the panel on reconciling smaller Canadian production to larger U. S. production in the automotive field.

At this panel it was pointed out that if automobile manufacturers had not decided to start manufacturing in Canada there would be no automotive parts industry in that country. At present Canadian automotive manufacturers making up to 10,000 passenger vehicles must have at least 40 per cent British Empire content in the finished product. Up to 20,000 annual production of passenger cars requires 50 per cent British Empire content, and where more than 20,000 units are made at least 60 per cent British Empire content is required to meet Government protection regulations.

Problems of producing many models of cars under one roof were discussed at this session. Discussion on die casting showed that no solution had yet been found to cut cost for low volume production. Deviation from U. S. car models to cut production costs were dealt with, and showed some possibilities, such as in one case where a car maker used the same hub cap for four years even though the U. S. model had been changed. It was felt such deviation from U. S. models could be done as long as it did not produce a servicing problem. Standardization of basic items for all Canadian car manufacturers, for such items as nuts and bolts, is being studied.

The session on foundry operations brought out the opinion that there should be more coordination between design engineers and production men. Shell molding, it was felt, definitely has a place in the foundry business, but has a long way to go before all the bugs have been eliminated. It produces better finishes and tolerances, and lower overall finished product costs. Nodular iron as an engineering material was felt to be an incoming material, and may replace steel in certain fields. Modernization and mechanization of foundries has made them better places to work in, but management was urged to watch capital expenditures in such improvements.

The panel on forgings revealed opinions that forging engineers should be called in early in design studies to help in lowering assembly costs, metallurgy problems, ease of manufacturing, tooling for machining and production volume. Automation was discussed, especially on crankshaft production. It was pointed out that automation can be profitably used if there is extremely high production. It is not good for flexibility nor for the small operator and it requires a high capital expenditure. Small manufacturers can competitively produce in certain volumes against the automatically operated plant, and are not faced with lengthy breakdowns. Automation is not a cure-all answer for the forging industry. Biggest problem in the industry is closer tolerances. Latest developments

(*Turn to page* 120, *please*)

Scheduling Problems in L-M Body Plant

PART II

LAST word of its kind in modernity, the Wayne (Mich.) assembly plant of Lincoln-Mercury Division, Ford Motor Co., has extensive facilities for body fabrication, with a body and sheet metal painting area alone of 204,000 sq ft, about 1/6 of the total area of the plant. This article, covering the body section of the plant, will serve to supplement the initial study on car assemblies published in AUTOMOTIVE INDUSTRIES, October 15.

Before turning our attention to the details of the operation consider some facts that may emphasize the complexity of the problem of scheduling production in the body shop. For one thing, approximately 50 per cent of current production is being specified in two-tone color finish. When it is considered that exterior sheet metal and the body require seven coats in the paint shop and that an extra coat is added for two-tone, the problem of scheduling and handling the work is more clearly seen.

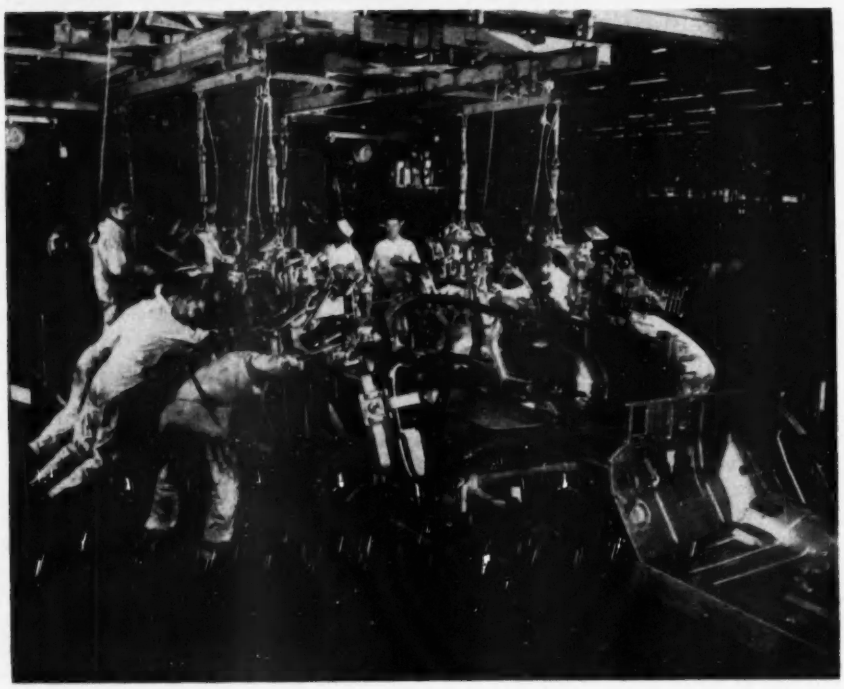
Actually there is still further complication: at the present time L-M offers about 13 different colors and these add up to 36 optional color combinations on the Lincoln line, 37 combinations on the Mercury line. In the trim shop, scheduling is concerned with 23 different combinations on Lincoln, 29 on Mercury. Besides this the Capri convertible offers five top options, the Mercury four.

Finally, it may be noted that Lincoln has five different body styles while Mercury offers seven, thus posing a major problem in scheduling sheet metal for body fabrication.

From the standpoint of the management perhaps the most noteworthy feature of body fabrication, and one that is considered to be quite distinctive, is the "gate" line for body integration. As illustrated, the "gates" are familiar massive framing fixtures usually employed for assuring correct alignment of openings —doors, rear windows, trunk lid, and windshield— during body assembly. At L-M, however, the massive gate fixtures for side panels serve first as individual welding fixtures, then continue on with the work locked in place to the rest of the shell for completing the welding of the body shell into an integral unit.

As illustrated, the gate fixtures are suspended from a heavy duty Anchor Steel overhead conveyor paralleling the main welding line. With the fixtures riding the conveyor, the side panels and other detail parts

BODY ASSEMBLING



L-M body assembly begins about here. It starts with attachment of the floor pan to the massive buggy which rides on the floor conveyor through body framing operations. At this stage the body begins to take form, starting with the installation of side panel gates to the floor pan.

Efficient Setup at Lincoln-Mercury Assembly Plant Provides for Handling of Many Body Styles and Color Combinations

By Joseph Geschelin

entering into this major sub-assembly are assembled and clamped into the fixture and welded into an integral sub-assembly by means of the familiar portable Progressive welding heads. This conveyor line operates at variable speed, ranging from three to 18 fpm.

Meanwhile, the basic assembly starts on the power driven floor conveyor which eventually feeds into the final welding line. Each body is built up on one of the heavy dollies, having fastening points corresponding to major locations on the final chassis. It all starts with the installation of the floor part and dash, followed by mounting of the main gates carrying the side panels. As the body shell is progressively built up, operators install the cowl assembly, roof assembly, and other parts; and clamp into place the other gates for controlling deck lid, rear window, and windshield openings.

Most of the welding operations on the body framing line are performed with portable Progressive welders, mounted overhead.

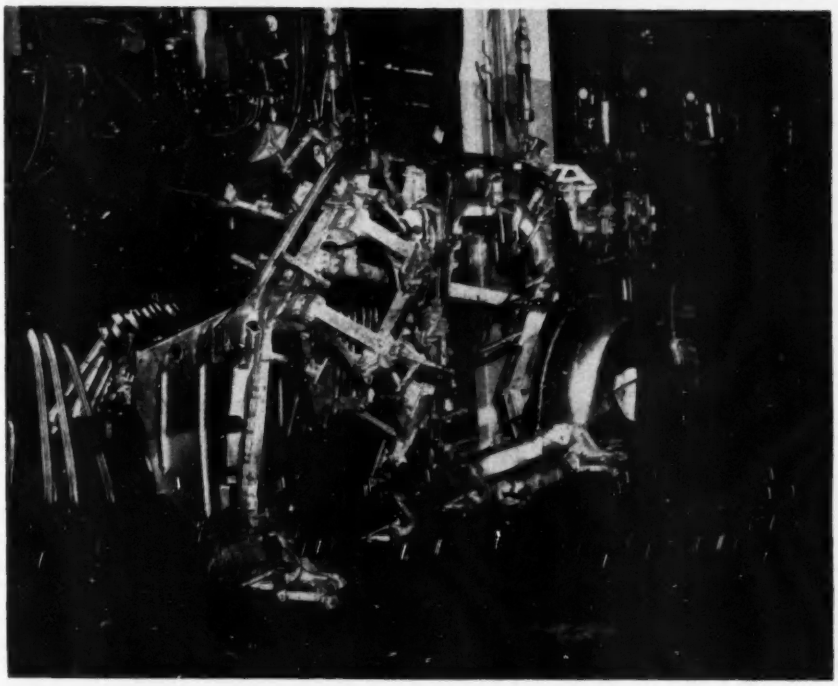
Prior to the start of assembly the underbody sections are prepared with all necessary brackets and attachments. One of the principal operations in this connection is performed in the Clearing welding press, illustrated here, the press being fitted with 144 guns.

The paint system is divided into two sections—one for body shell painting; the other for sheet metal. Ventilation for spray booths, gas and tack-off and flash enclosures is designed as an accurately balanced system of filtered and heated fresh air supply, and paint contaminated air exhaust. Fresh air supplied to the booths is processed through two elevated air supply systems, each with a capacity of approximately 200,000 cfm.

Fresh air is drawn from the outside through large intakes on the roof, the air being heated if necessary from 10 to 35 F. It is drawn through a water wash to remove heavier dust particles, then through a special oil filter to remove even the minute particles that may have passed through the water wash. The air is then heated to 80 F and delivered to the top of the spray booths. Here again the air is passed through a bank of filters before entering the booth.

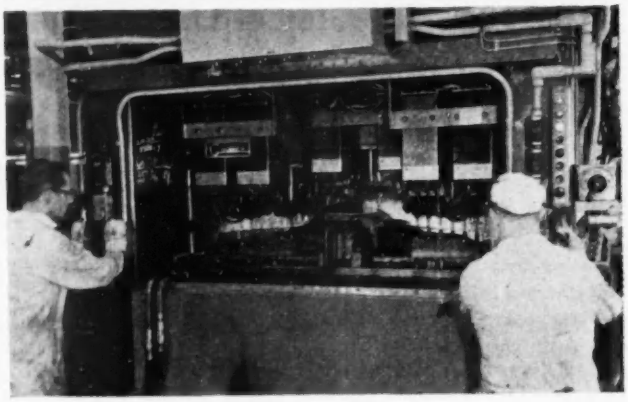
Exhaust ventilation to remove paint contaminated air is handled by means of exhaust fans having a capacity of about one million cfm. It may be noted at this point that

SIDE PANEL WELDING



Side panel welding assemblies and gates are suspended from an overhead conveyor while traversing the sub-assembly area. The side panels and detail parts are mounted and clamped securely, then welded into an integral assembly before they reach start of the body framing line.

FLOOR PAN WELDING

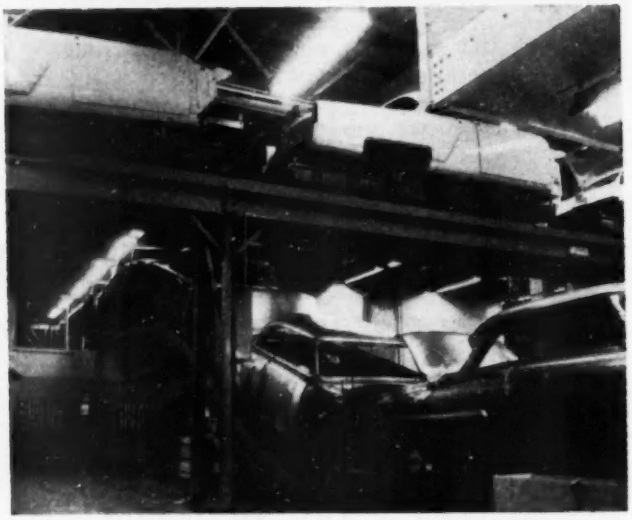


One of the major items of equipment in the body assembly area is this Clearing welding press which is used for welding floor pan sections.

all spray booths, whether supplied by R. C. Mahon or Binks, are of downdraft, water-wash type with ventilation so arranged that exhaust air is drawn down through floor gratings, then to the back side where a system of water sprays washes the paint from the air. The air then is drawn through baffles to remove moisture and exhausted into the atmosphere.

An enormous amount of water is required to service the spray booths, being circulated by nine large Allis-Chalmers induction-motor driven pumps with a combined capacity of 54,000 gpm. Obviously, means must be provided for reclaiming the water and recirculating it continuously. To this end, all of the contaminated water from the spray booths is pumped through a system of under-

BONDERIZING; PAINTING



Noteworthy junction point in body plant. Bodies in white enter the paint area on the lower conveyor enroute to Bonderizing while finish-painted bodies cross over above this line on their way to the trim lines.

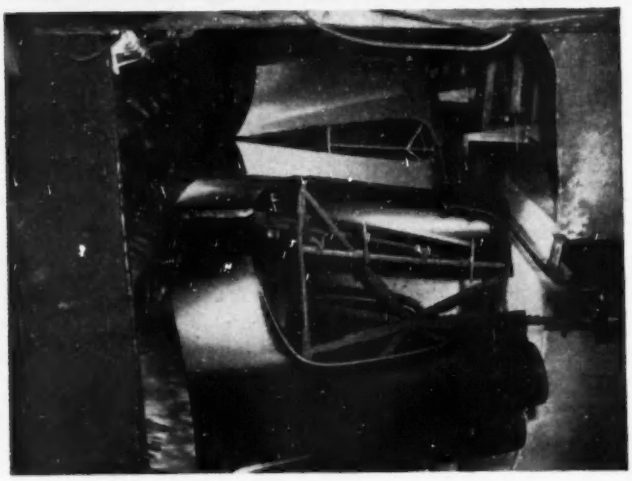
ground troughs to two large tanks. Here the sludge floats on the surface of the water, is skimmed off at one end and placed in drums for disposal. The de-sludged water is filtered and then recirculated to the spray booths.

Mahon spray booths for red prime, surfacer, and color, are each about 100 ft long. The Mahon ovens serving these booths each have a bank of 121 direct gas-fired burners for heating. Red prime is dried for 55 min at 325 F; surfacer is dried for 50 min at 300 F; color is dried for 50 min at 240 F; while two-tone jobs are dried for 30 min at 260 F.

The body painting system starts with a 177-ft long Bonderite system supplied by Mahon, served by an Anchor Steel conveyor system. It includes about 380 ft of Mahon spray booths, and a total of 1466 ft of Mahon direct gas-fired ovens.

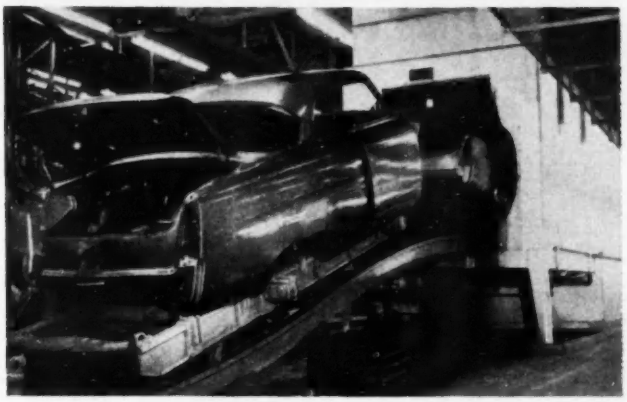
The sheet metal painting system features

HOOD, FENDER SPRAYING



Hoods and fenders are sprayed automatically as they move through the booth on rotating fixtures.

TUNNEL BONDERIZING



This view shows bodies as they enter the long bonderizing tunnel in the paint area in preparation for finishing.

a 194-ft long U-shaped Bonderite system; 175 ft of spray booths; 45 ft of Flo-Coat booths; and 1330 ft of direct gas-fired ovens, of which 1240 ft is suspended above the floor level. Drying ovens in this system were supplied by Ross Engineering.

Sheet metal parts are sprayed in Binks booths throughout the system. In this connection it is of interest to note that Binks also has supplied an automatic spray booth for surfacing hoods and fenders. The conveyor system serving this booth is fitted with large spinner fixtures, each one holding four fenders or four hoods to form a symmetrical pattern. As the fixture enters the booth area it begins to rotate, thus presenting all surfaces to the automatically operated spray guns. To handle the large volume of over-

SPRAY BOOTH PAINTING

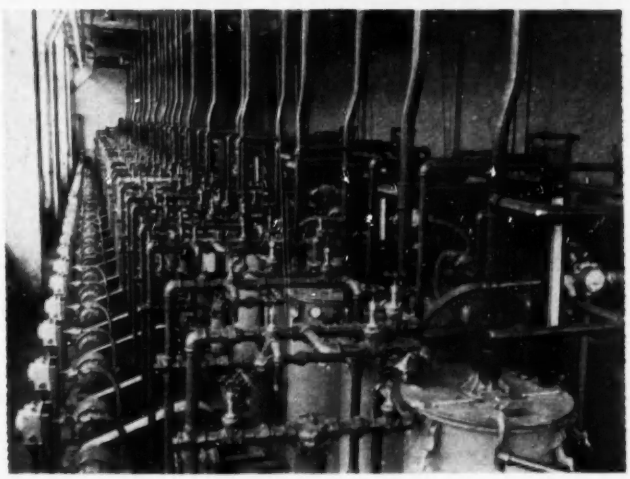


Interior of one of the paint spray booths in the paint area. As described in the text, clean air is forced into the booth by downdraft, paint-contaminated air being drawn through the grating in the floor.

spray incident to this operation, the booth has a full water-wash back panel while the entire floor is arranged to cascade the water.

On sheet metal, the Flo-Coat parts are dried for one hour at 300 F; the surfacer mentioned above is dried for 55 min at 300 F; while color is dried 50 min at 240 F.

PAINT BUILDING MIXING



One of the interesting features of the paint setup is the provision of a remotely located paint-mixing building, containing mixing and circulating equipment for 25 body colors, four prime colors and chassis black. Two mixing tanks each of 60 gal capacity are provided for each color. Paint is mixed and reduced in these tanks, then pumped through 1¼-in. lines to the spray booths, approximately 70,000 lineal ft of pipe being used for this distribution system.

This article is the second of two devoted to operations in Lincoln-Mercury's new assembly plant at Wayne, Mich.

Perspective of paint mixing building showing the piping leading to the various paint spray booths.

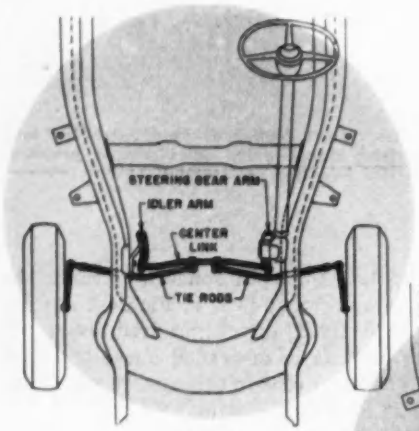


FIG. 1
Conventional steering linkage

Construction and Operation of ROSS Linkage Type POWER STEERING

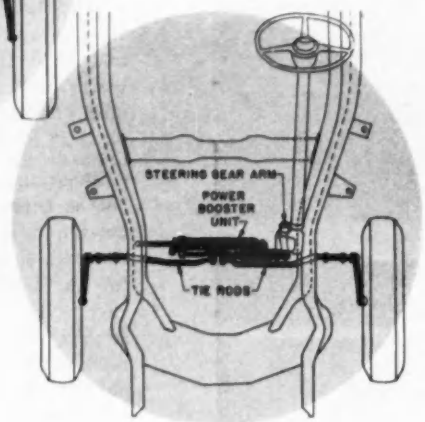


FIG. 2
Power steering linkage

THE linkage type power steering assembly, recently added to the line of Ross Gear and Tool Co., consists of a double acting cylinder, a valve and a link for attachment to the reach rods. The piston rod is anchored to the right frame member with a lance type connection cushioned with rubber disks. The other end of the unit connects to the pitman arm in a conventional manner. Assembly of the reach rods, and supply and return lines to pump complete the installation. Figures 1 and 2 show how modifications were made in a car to accommodate the parallelogram steering linkage.

The valve has built-in control and no field adjustments need be made. Valve ports are hardened, ground and honed to resist wear from foreign particles which may get into the oil. Valve openings are held to close tolerance to maintain responsiveness of the steering, important in directional stability. The valve and power cylinder are sealed to prevent entry of dust, water, mud or any foreign matter.

Approximately 80 per cent of the steering task is done by the unit, the remainder being left to the driver for retention of full road sense and feel in driving. A reserve manual steering control is automatically avail-

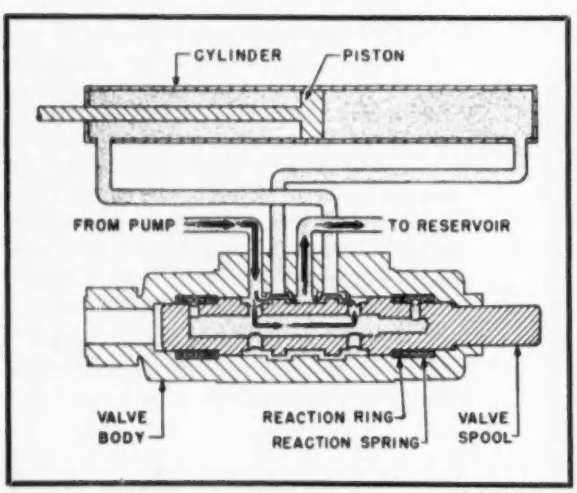


FIG. 3—Fluid flow with no steering

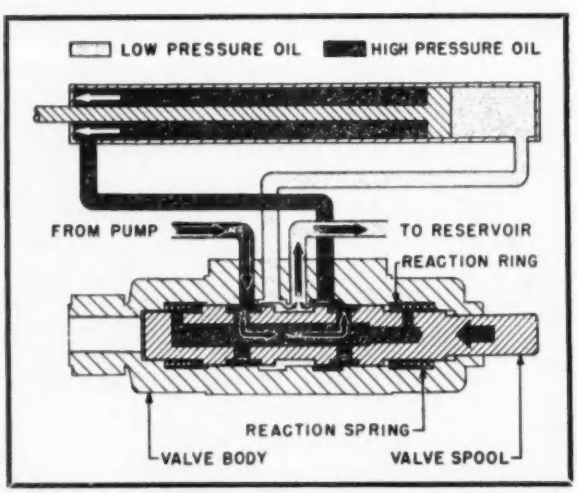


FIG. 4—Fluid flow, left turn

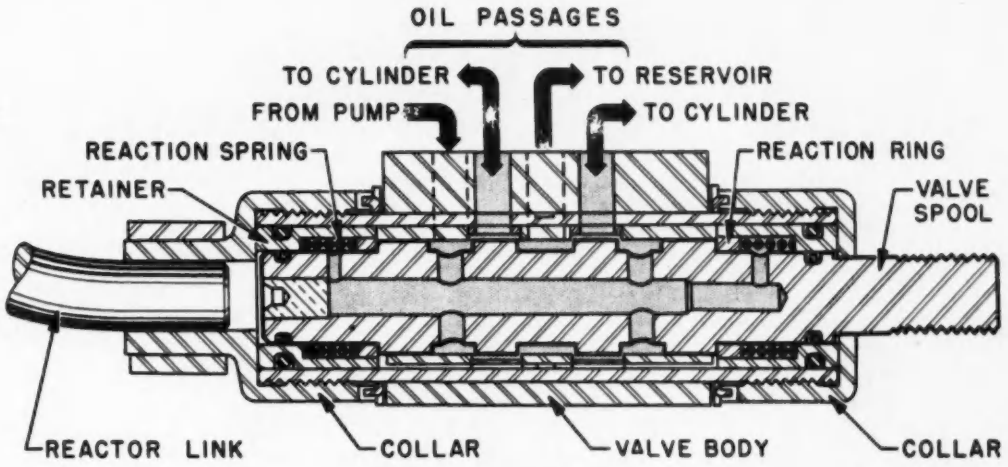


FIG. 5—Valve construction

able as in all Ross power systems on the market.

Operation of the unit is shown in Figs. 3, 4, and 5. The valve is actuated by spool movements which respond to steering by the driver. Unless steering is being done, or a road reaction is being counteracted, the spool stays on center. When the valve is on center, the oil circulates from pump to valve to reservoir at low pressure and low power demand.

In making a right turn the spool moves to the left. Pressure oil is admitted to the left hand end of the cylinder, thus giving power assistance to the manual movement.

In making a left turn the spool moves to the right, admitting pressure oil to the right hand end of the cylinder.

A road reaction, such as can result from a chuck hole, pavement shoulder, tire blowout or obstruction, will instantly position the valve to block the reactive force. The valve is at all times biased to center sufficiently, by springs and hydraulic reaction, to retain "feel of the road" in driving.

The valve and actuator are the same type as those used in other Ross power steering gears. Low operating pressure lightens the duty of pump bearings, seals, and hose connections.

The new units already have proved their performance and versatility by many production applications, including a passenger car in large volume.

Integral type power steering, in production for over 10 years by Ross, will be continued.

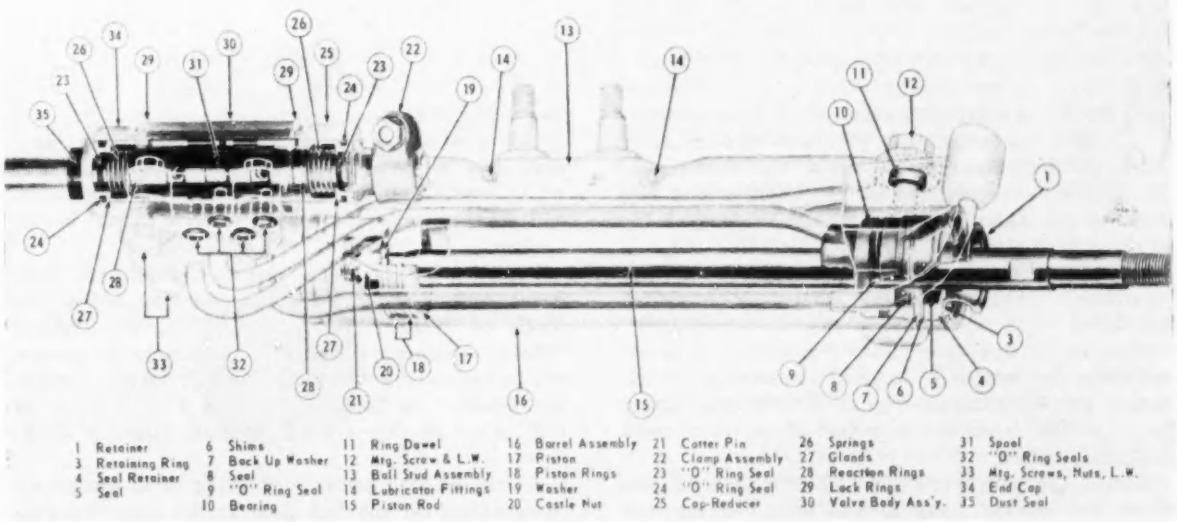


FIG. 6—Phantom assembly



Many New Developments Attract

GREATER interest than ever before in new equipment, materials, and processes was indicated by the throngs that taxed the capacity of Cleveland's Public Auditorium to view the 35th National Metal Exposition last month. Count at the gate passed the 100,000 mark, not including those in attendance at the 462 booths of the exhibitors nor approximately 2100 engineering students who visited the show.

Many of the new developments on display were described in the October 15 issue of AUTOMOTIVE INDUSTRIES. The following description of new offerings at the show will serve to supplement those which were published earlier.

Norton Company displayed Crystolon heating elements for electric furnaces and kilns. These new units, which are made of self-bonded silicon carbide, have a central heating section called the hot zone and two terminal sections called the cold ends. They will be available in sizes up to 1¼ in. diameter in January, 1954, while elements 1½ and 1¾ in. diameter will be available in June. The new Norton B9 resinoid and R50 rubber cut-off wheels were shown in operation.

Precision hard chrome plating for cutting tools, gages, and wearing parts was demonstrated at the booth of Wagner Bros., Inc. With the Wagner "Morey process" equipment, clean, sharp corners can be maintained when shoulders, grooves or threads are plated. As there is no need for roughing or etching to provide a bond, original finish is duplicated.

A new, multiple-action compacting press was shown in operation for the first time by the Baldwin-Lima-Hamilton Corp. Designated the Model C, it is said to have the exclusive feature of quick, accurate ad-

justment to allow for changes of density or weight while the press is in operation. The die holder and core rod float independently of each other against pneumatic cushions, the distance of movement being controlled by positive adjustable stops. Depth of fill and stroke of the bottom punch are adjusted by two separate controls. The relative position of the core rod to the die is also adjustable to aid in controlling the fill when making counterbored parts. The shuttle, which is air operated and cam controlled, is supported on guide rods with a spring-loaded cut-off ring to prevent loss of material. All moving parts are completely enclosed and sealed to prevent any abrasive material from getting into bearings, etc., and all bearings subject to load are pressure lubricated. Although the press is specifically designed for the compacting of metal parts, it will also be used to compact certain types of grinding wheels and ceramic parts.

General Electric Company's Tri-Clad 55 motors were shown for the first time. These motors, which are built to latest standard NEMA frame dimensions, average 22 per cent lass weight and 50 per cent less volume. The Tri-Clad 55 has a new insulation system, bearing assembly, and ventilation plan. The new motors are much quieter than previous models; noise level of the 10-hp motor being as low as the former two-hp model.

Magnaflux Corp. demonstrated the Magnatest FM-100 conductivity meter which evaluates material, alloy, and hardness. This non-destructive test instrument also sorts mixed non-magnetic metals and determines degree of age hardening of aluminum and magnesium alloys. It uses the electrical conductivity of materials as a measure of hardness, purity and other specific characteristics. A small coil in the detector induces eddy currents in the test material, which in turn affect the impedence of the coil in proportion to the conductivity of the material. Special electronic circuitry enables use of the detector on surfaces that are covered with oxide or moderately rough. The detector tip is about one-half inch in diameter.

The new Cincinnati Flamatic power control unit—a central unit for extremely precise control of fuel gas and oxygen for various selective heating operations—was first announced and demonstrated in production on customer's jobs at the booth of the Cincinnati Milling Machine Co.

Three selective heating setups, two for hardening and one for brazing, were used to demonstrate this new unit. It embodies the basic Flamatic principles of precise control of temperature to insure uniform results; accurate metering of fuel gas and oxygen to achieve exact control of heat input, and automatic cycling except for loading and unloading parts. It broadens Cincinnati Flamatic applications by permitting the user to employ a wide variety of simple, low cost tooling and work handling operating units. Thus the user can go from one job to another without dismantling the tooling, and then return and re-run a job at any time with duplication of original results.

The Flamatic Power Control Unit, in addition to controlling fuel gas and oxygen, also controls pressure of water for cooling and quenching; air for actuating cylinders, and controls electrical power for automatic work movement and operational cycling.

Brand new ultrasonic cleaning equipment was shown by the Ohio Crankshaft Co. Developed in conjunction with Bendix Aviation Corp., the machines will have magneto-strictive transducers capable of handling up to 250 kw, and will operate at frequencies of 10 to 20 kc. Complete details are not yet available.

A Model FGT Baldwin-Emery SR-4 type universal testing machine of 50,000 lb capacity in tension and compression was on continuous demonstration. This new model is said to be the first production testing machine in which SR-4 resistance wire strain gages are used for load measurement. Loads are measured by means of two maximum-precision-type SR-4 Load Cells of 25,000 lb capacity each, at the base of two vertical tie rods.

The Bath precision stretch former with new traversing wipe unit for aircraft framing members, jet engine components, and guided missile parts was in operation at the display of the Cyril Bath Co. It features very close control during forming, resulting in great accuracy and negligible spring back, according to the manufacturer.

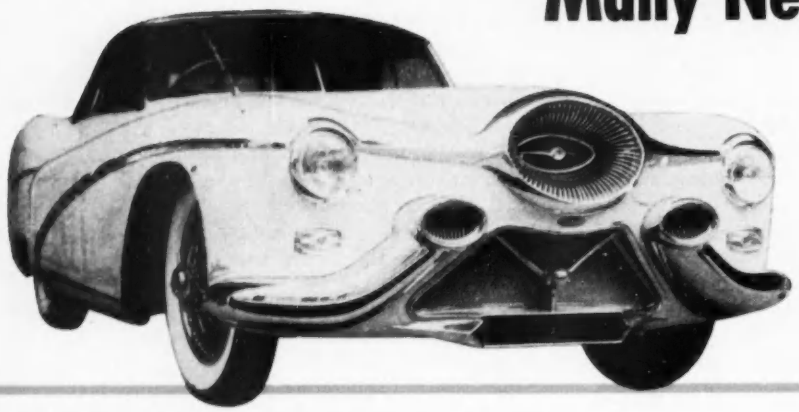
Elox Corporation demonstrated its M-400 electronic type machine tool for toolroom and production work where hard, hardened or difficult-to-machine materials must be proccessed or fabricated, or difficult shapes must be machined. In this machine, controlled electrical discharges are caused to flow between the tool and the work piece. These electrical discharges remove exceedingly small amounts of material from the work piece in the form of microscopic particles. Elec-

(*Turn to page* 124, *please*)

Huge Crowds at METAL SHOW

By [redacted]erts

Many New Models at FRENCH AUTOMOBILE SHOW



Salmson with special light alloy body. United Press photo.



This REAC sports car has a plastic body and is powered by a Dyna Panhard engine. United Press photo.



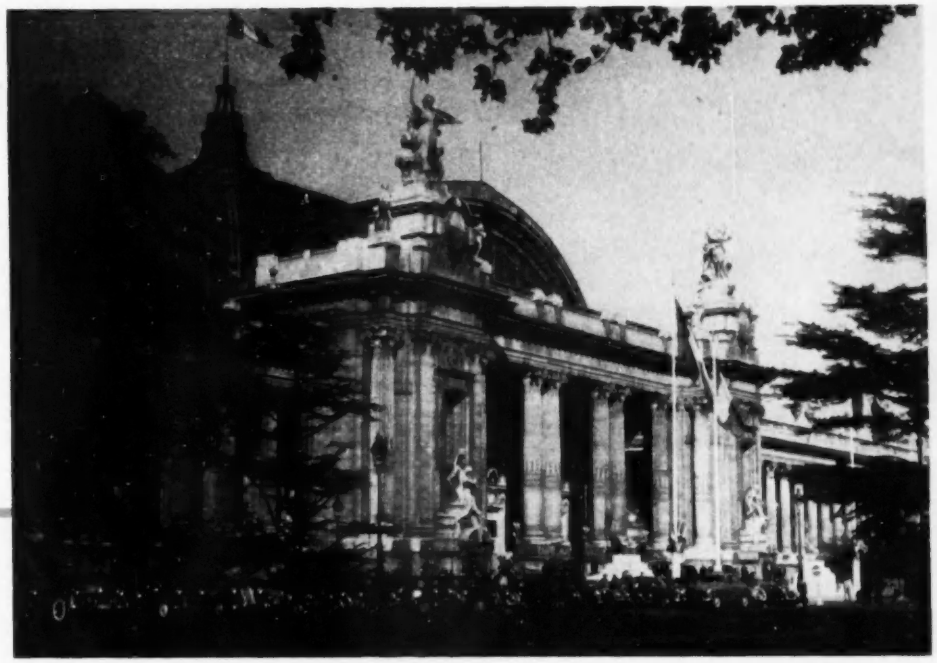
Ford Vedette Vendome with 100-hp, V-8 engine made in France.

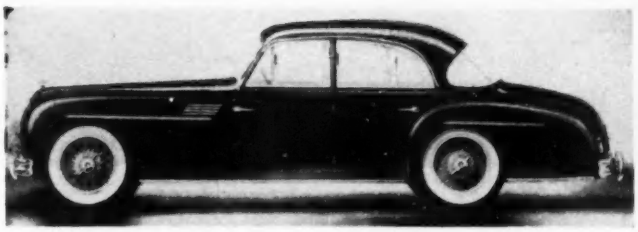
PARIS,
FRANCE

THE fortieth French Automobile Salon, staged last month in the artistic Grand Palais on the Champs Elyseès of Paris with a vast overflow on the southeast edge of the city, was a truly representative presentation of the automobile industry. France, U.S.A., and Britain had practically all of their manufacturers present. Italy, with a smaller industry, was 100 per cent present and Germany had her leading makes. To these the one-firm nations were added Sweden, Czechoslovakia, Holland, and Spain. No makers came from behind the Iron Curtain.

At a time when all attention is being focused on production programs, the number of new models was surprisingly high, which indicates the greater flexibility of the European industry with its more moderate outputs. Flouting national sentiment, which requires new British models to be first presented to the British public, both Standard and Ford made a bid for foreign markets by presenting their new types in Paris, before uncovering them at Earls Court. These are what the British prefer to describe as light cars (although they do not always have a low specific weight), but are small four-cylinder, four-passenger sedans of a type best suited to British economic, fiscal and highway conditions. When production was resumed after the war, these types were put aside in favor of larger models more suitable for export markets.

Now, return to pre-war conditions is com-





French Talbot Largo Record sedan.

plete with Austin, Morris, Standard, and Ford back in the "light" car class with four-cylinder engines of 70 cu in. maximum piston displacement. In this reshuffle Ford no longer offers the lowest price car; this position has been taken by the Standard Eight with a basic price of £339. Roughly 50 per cent has to be added to this figure before the car goes into the hands of the home user, but for export it starts away at the very attractive price of $950.

The new Ford Prefect and Anglia are the British company's latest bid in the export market for a small, low-priced car with adequate power, internal roominess and modern lines. With four- and two-doors respectively, they incorporate many of the features of the two smallest Fords of the same name (production of which will now be discontinued), and of the larger Consul and Zephyr which were introduced in 1951.

The four-cylinder engine, taken over from the old Prefect, has 2.5 in. bore and 3.64 in. stroke with 71.5 cu in. piston displacement. But power rating has been raised to 36 hp at 4400 rpm by increasing compression ratio from 6.16 to 7 to 1, and by including an exhaust manifold heat control valve. Transmission is through a single-plate dry clutch, three-speed gear box with central lever, and ring gear and pinion final drive.

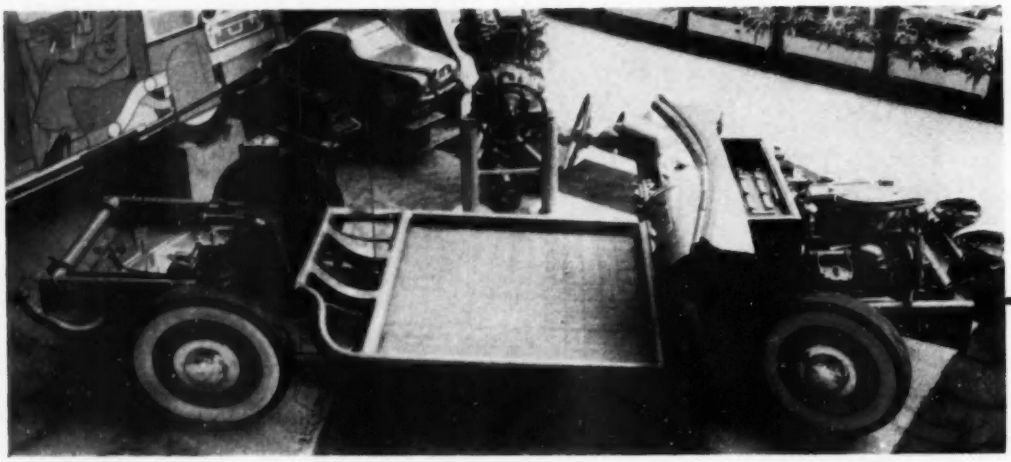
Body and chassis designs are adapted from the Consul and Zephyr. New Prefect and Anglia bodies are identical except for side panels, and are of all-steel welded construction. Front wheel suspension is scaled down from the larger Ford models. Longitudinal semi-elliptic springs are used at the rear. Brakes and clutch are hydraulically operated with pendant-type pedals. Electrical system is 12 volts. The hood is hinged at the front, and trunk capacity is 10 cu ft.

Overall length of the car is 12 ft, 7 in.; wheelbase, 7 ft, 3 in.; tread, 4 ft; and weight, 1620 lb. Basic price in Britain (without sales tax) is the equivalent of $1108 for the Prefect and $1040 for the Anglia.

English Daimler selected Paris for the first presentation of a coupe on the new Conquest chassis. This two-door, four-passenger model had a power operated top which folds into a compartment behind the rear seats. The engine had been stepped up to 92 hp at 4400 rpm by the use of a special head and dual carburetors. Daimler continues to use the fluid flywheel, combined with a preselective epicyclic transmission. Independent front suspension springing is by laminated torsion bars.

Lagonda presented a new engine with piston displacement increased to 183 cu in. by enlarging the bore from 3.07 to 3.27 in. This

By W. F. Bradley
Special European Correspondent for AUTOMOTIVE INDUSTRIES



Chassis of the Joymobile which has direct hydraulic drive to each rear wheel.



Panhard with six-passenger, all-aluminum body.

was done while retaining the same crankshaft, without any changes in cylinder block dimensions (except the cylinder bore) and with only minor changes in the head. With an 8.16 to 1 compression ratio and fitted with two carburetors, the Lagonda peaks at 5000 rpm with 140 hp, maximum torque being 166 lb ft at 2500 rpm. Such chassis features as independent rear suspension, inboard brakes, and cruciform frame, remain unchanged.

If exception is made of the Panhard 1320-lb, six-passenger sedan no entirely new models have been produced by French makers. Renault has made detail modifications on the 122 cu in. Fregate sedan as it went into production, and the small rear engine model, of which half a million have now been built, has more leg room at the rear, better heating, and increased baggage space. Mechanically nothing has been changed. Peugeot continues to concentrate on one type, a frameless construction, the mechanical units of which are employed for delivery vans and light commercial vehicles.

Simca has made some mechanical changes, most important among them being the adoption of the Gemmer steering gear in place of rack and pinion. This movement has become rather general, for Renault also started with rack and pinion for the Fregate and then adopted the Gemmer, and this gear is also being used by Ford, Hotchkiss and several of the truck makers. Simca's novelty is the Grand Large body with no door posts which provides maximum visibility in every direction. Despite all rumors, Citroen continues the same three front-wheel drive models with no important changes.

The French Ford Co. presented the Vedette Vendome with the 100 hp V-8 engine, larger and more luxurious than the two passenger-car models produced up to the present. A show attraction was the X-100 experimental prototype built in the United States—a two-door, five-passenger cabriolet.

Now the only French producer of high-powered sports cars, the Talbot Co. presented two models—the Lago Grand Sport and the Lago Record, both with bodies designed and produced in its own shops. Although only one size of engine is produced, a six cylinder of 3.66 by 4.33 in., there are two models. The standard engine with a compression ratio of 6.5 to 1 develops 170 hp at 4200 rpm, while the sports version, with a ratio of 8 to 1 and three dual Solex carburetors, gives 210 hp at the same engine speed. Changes include a new camshaft and new intake and exhaust manifolding to assure greater flexibility and quieter operation at low speeds. Talbot continues the use of the Wilson epicyclic transmission. The new sports model is claimed to have a maximum speed of 125 mph.

The production cars in plastic at the Paris Salon are of American construction. The French industry, however, is becoming aware of the advantages of this material and its first appearance is with some of the



Ferrari sports model with special Vignale body. United Press photo.



Simca with "Grand Large" body which has no door posts.



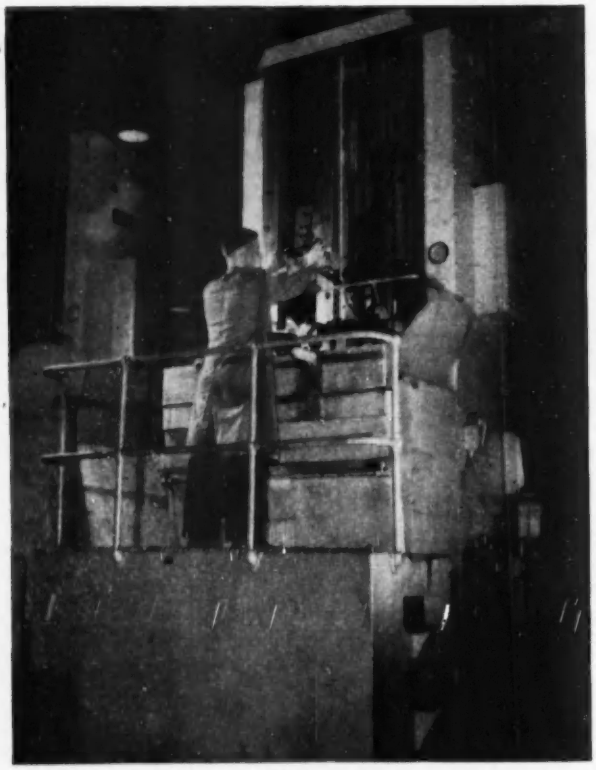
New British Ford, the Prefect. The Anglia model is almost the same in appearance, but has two doors instead of four.

smaller makers. The successors of the former Rosengart Co. have produced two models known as the Sagaie, a coupe and a convertible, in which the front fenders and hood, the tail and the external side panels are in plastic. The instrument board also is a plastic moulding. A feature of these cars is the use of an all light-alloy power plant, with a flat-twin, valve-in-head roller bearing engine of only 45.7 cu in. piston displacement, for which the makers do not hesitate to claim 40 hp. Clutch and transmission are in one unit, also of light alloy.

Another new maker in the plastics field is Marathon with two models, Corsaire and Pirate, which will be entirely in plastic. Although prototypes were shown, it does not appear that these are yet in production. The two-door, four-passenger sedan weighs 1150 lb. Marathon makes use of the Panhard flat-twin 52 cu in. air-cooled engine, which develops 40 to 42 hp, but instead of the front mounting it is carried at the rear and is turbine cooled. It is known that two important firms are carrying on development work on plastic bodies and because of the advantages of this system for limited volume, its adoption on an important scale is possible within a year.

Of the three new Mercedes cars for 1953—the 170 S-V, the 170 S-D, and the 180—the last mentioned is the most outstanding. Its dominant feature is a one-piece, all steel frame-and-body with stressed inner and outer skin, to which the mechanical units are attached. While this has become common practice in Europe, as exemplified by Citroen, Peugeot, Renault, Simca, Fiat, Lancia, etc., the new Mercedes 180 has the distinction of possessing a welded-steel horse (*Turn to page* 114, *please*)





Bolt bosses, butt faces, and half bores of connecting rods and caps are broached simultaneously on machines of the type shown here.

LONDON, ENGLAND

SOME interesting machining and mechanical handling techniques have been incorporated in its new plant layout by F. Perkins, Ltd., which has become by far the largest manufacturer of Diesel engines in Britain, and claims that its present capacity in terms of horsepower produced is greater than any other in the world today. Current output per two-shift day is 220 engines, but the potential is stated to be over twice that figure. Over 100 British and foreign manufacturers are now offering Perkins Diesels in their trucks, tractors and other equipment. Seventy per cent of production is exported, and nearly 100,000 Perkins engines are in use in 118 countries.

Standardization of design as the basic policy was followed closely from 1937 until last year with a concentration on the P series—three engines with the same bore and stroke and many common parts. These were originally intended for automotive purposes, but modified versions for agricultural, marine and industrial applications were later introduced. The aim was to mass-produce small proprietary Diesels interchangeable with existing gasoline engines.

But as production increased, a general characteristic of British industry was encountered; the extreme diversity of vehicles and equipment

Tooling Innovations at Perkins Diesel Plant

By David Scott

At left is view of the "P" Series engine assembly lines.

powered with internal-combustion engines restricted that market for a basic power unit. The comparatively high initial cost of an oil engine was a further obstacle to increased sales. Thus a departure from the policy of design standardization became necessary and last year the L4 was introduced.

This four-cyl engine was meant to meet the demand for a low-cost Diesel for agricultural and industrial purposes where the price factor was more important than space or weight limitations. While maintaining robust construction, economies were effected by simple design with such features as a three-bearing crankshaft, geared timing drive, flange-mounted fuel pump and low camshaft.

Then, with the North American and Continental markets in mind, another new engine—the R6 went into production this spring. This 108 hp unit (described in AUTOMOTIVE INDUSTRIES, June 15) is intended for a seven-ton chassis operating at road speeds much higher than those permitted in Britain. The S6 marine engine, produced only in limited quantities, represented an earlier break with the original policy of standardized design.

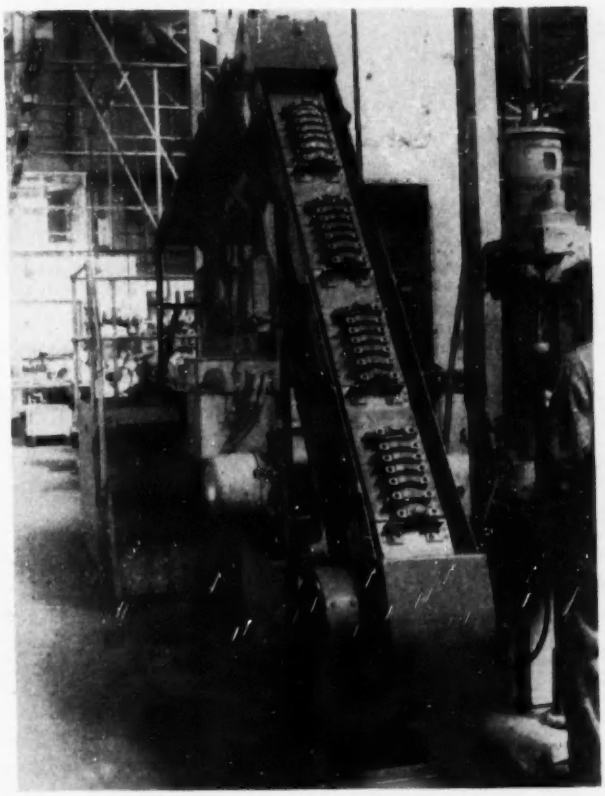
But while the necessary broadening of the production program meant increased tooling and assembly operations, these have been kept to a minimum by the universal character of some of the machine and assembly lines, and of the engine test shop and finishing department.

Cylinder block and head castings for the P3 and P4 are machined on a composite line. Dual fixtures are used on the pair of heavy-duty duplex millers for roughing and finishing panrail and head faces, with the three- and four-cyl blocks positioned in separate fixtures along the table. Change of table travel effects the shift from one size block to the other.

Another example is the use of two parallel two-way multi-spindle drills, each with one vertical and two horizontal heads, for drilling the head and two end faces of the P3 and P4 blocks. The first machine drills the P4 head face and front ends of both, the second drills the P3 head face and rear ends of both.

In several machines, changeover is made by removing tools from some of the spindles. When completely separate machines are required, there is a by-pass section of roller track. One size of block is usually kept on the line for at least several hours, but a complete shift to the other can be made in 20 min.

A common assembly conveyor with universal pallets is used for P3 and P4 engines. By altering the position of the fixture support bars, either engine can be accommodated with head, side or pan upwards. After assembly, complete versatility for handling all six types of engines is the feature of the test shop and



Elevator conveyor used for automatic handling of bearing cap sets to broaching machine at higher level.

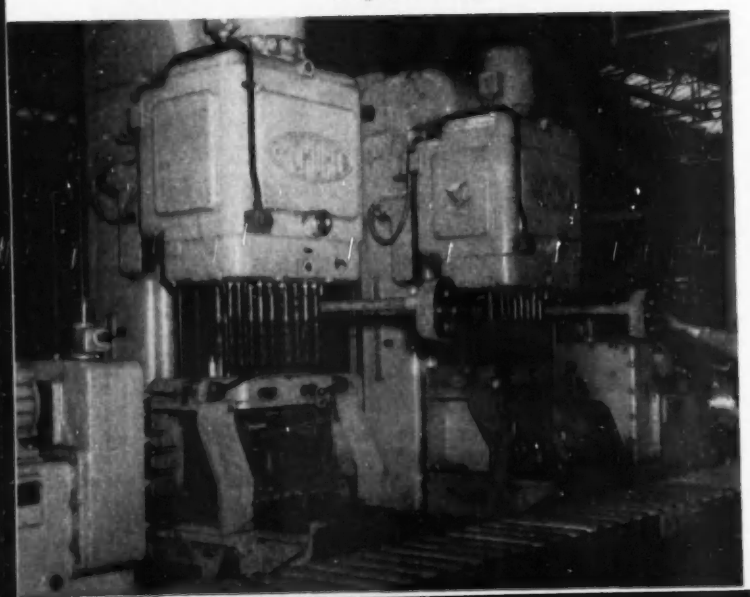


The first of these two Heller duplex milling machines rough mills the head and oilpan faces of cylinder blocks; the second finish mills them



Drilling, core drilling, and reaming of the eight tappet holes in the L4 cylinder block are done by this Burkhardt & Weber three-station hydraulic transfer machine.

Archdale two-way drilling machines which drill head face and ends of cylinder blocks.



finishing department. An overhead conveyor links the different assembly lines and carries the completed standard engines to the test shop at the far end of the factory block. Here each engine is successively shunted to one of the spur tracks overhanging the 80 universal test beds and lowered into position. Beds are fitted with fuel, exhaust, water and power take-off connections adaptable for any engine.

Following the test run, engines are returned to the monorail and transported to the finishing shops where they are dropped onto individual pallets. Universal fixtures of original design are soon to be introduced here. Each pallet, which again can handle any engine, consists of four vertical supports of welded steel tubing mounted on a pair of open-ended rectangular sheet steel boxes. Length of pallet is adjusted by telescopic longitudinal tubular members. The base boxes permit the entire unit to move easily on the roller track and to be engaged by the two fingers of a fork lift.

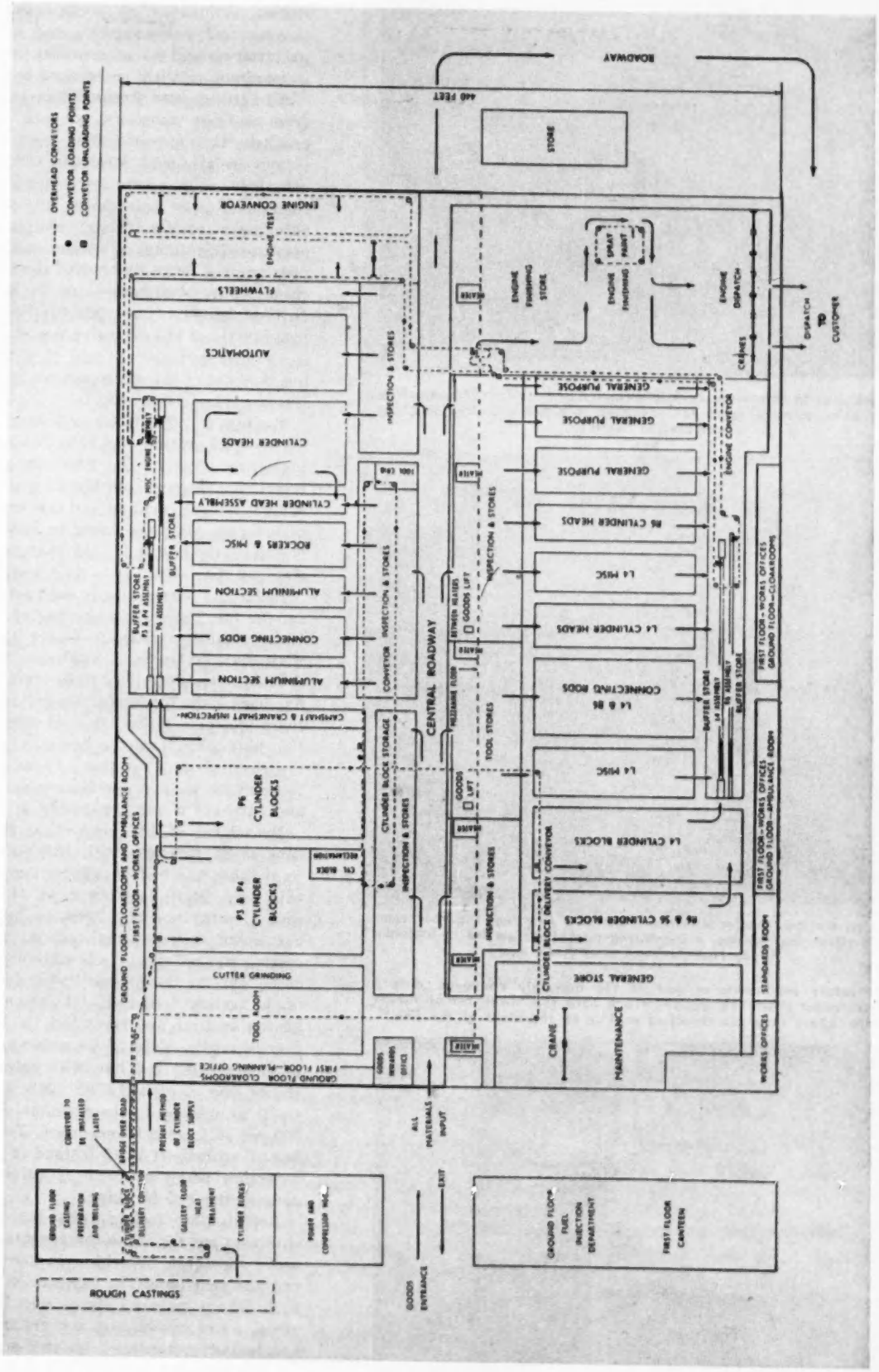
Engines are to remain on these pallets for finishing, storage and final delivery to the customer. They will be removed only for painting when an overhead chain conveyor carries them through the spray booths. In the finishing department, standard fittings and external auxiliaries are removed when necessary and replaced by special equipment according to the customers' requirements. Most common alterations are flywheel and housing, air cleaner, and mounting brackets.

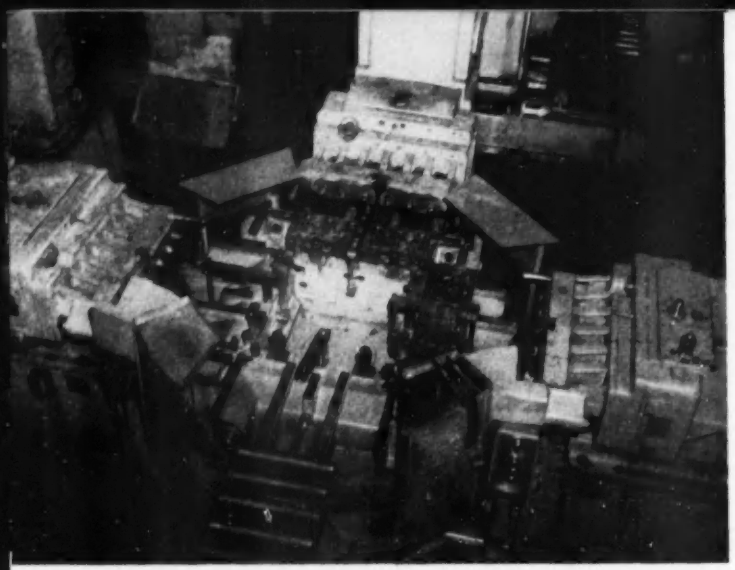
The new plant layout, completed earlier this year, was carried out over a period of eight months without any break in production. While floor space was doubled to total 316,000 sq ft, the intention was to quadruple output capacity by doubling productivity per unit area.

Production lines for the P-series engines were set up in the new factory extension, and when these went into operation the L4 and R6 engines were progressively introduced as the old block was converted. Replanning involved the installation of 450 new machine tools (one-half the present total), relocation of 380 existing machines, and sitting of 2400 ft of overhead conveyor and 4000 ft of roller track complete with turnover fixtures, gates and lifting sections.

Present floor plan is herringbone with a central roadway for delivery of parts by suppliers at the first or loading station of the appropriate machine lines, which branch off at right angles on either side. Assembly conveyors run parallel to the roadway along the walls of the building. The goal was to combine flexibility with a hard core of mass-production through higher output

PERKINS' NEW DIESEL MANUFACTURING LAYOUT 1953



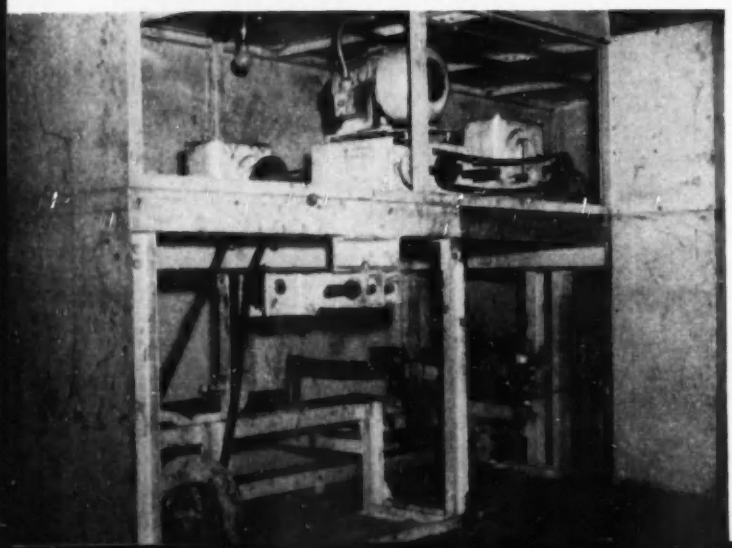


British Asquith three-way horizontal screw unit multi-drilling machine with hand indexing table for roughing, semi-finishing, and finishing combustion chambers.



This six-station transfer machine is one of a pair that together complete all boring, drilling, and reaming operations on the L4 cylinder head. Time for each head is 1.9 min.

Fast return mechanism at end of the assembly conveyor. Empty pallets coast down the inclined track onto the lower set of return rails where they are returned rapidly to the start of the line.



tooling, elimination of stocks between machining and sub-assembly, and extensive palletization and use of overhead conveyors to maximum utilization of floor space.

All castings and forgings are purchased from outside suppliers, as are finished crankshafts and some fuel injectors. Injectors are also made locally in a small self-contained shop where exceptionally close tolerances are maintained by precision checking at each machining station by the operator. Highlights of tooling on the main floor are the large number of German machines (purchased because of the length of British delivery times due to the defense program) and the extensive use of broaching for connecting rods and caps. Seventy-five per cent of the machine tools in use are less than five years old.

Tooling for the block and head of the low-cost L4 engine has been designed for high productivity. The first machine line is entirely German and the 11 stations for various milling, drilling and tapping operations on the block are linked by roller track. However, the layout is such that automatic transfer may possibly be installed later.

Elsewhere automation is used extensively for the L4. There are a number of German Huller and Burkhart & Weber two- and three-station transfer machines for core drilling, reaming, deep hole drilling and fine boring the block. For the cylinder head there is a pair of British Archdale six-station automatic lines for finishing all drilling, boring and reaming. These combine 164 cutting tools in simultaneous operation and turn out a completed head in 1.9 min.

Broaching of the connecting rods and caps is of interest, with the half bores, joint faces and bolt boss faces machined in this way. Main bearing caps (integrally cast in sets) are also split by broaching, cutting-off being completed in five successive strokes on a Weatherly-Oilgear machine. On the final stroke, with full travel of the vertical U-shaped slide, the end faces of the casting are machined by broaches carried on the sides of its upper part. The new connecting rod line with only 19 machines has a capacity of 1000 units per shift, as opposed to the previous output of 500 per shift with 30 machines. Total number of operations is 12 instead of 17, this reduction being assisted by coining both ends of the rod forgings.

Redesigning rocker arms has cut machining time for those components as well, and here again broaching is used on the pad and rear boss. The two-station fixtures each take a pair of right- and left-hand arms. After machining, rocker arm faces are induction-hardened on the production

line by an automatic machine with a continuously-indexing rotary table.

The vertical broaches at Perkins have realized a space saving of three, four and even five to one over previous machines doing the same work. Other methods of floor space conservation include the greater use of multi-purpose machines, more spindles in multi-head drills, and overhead power and air connections. Strengthening the roof has eliminated many of the vertical columns which would be needed for hoists and conveyors while still permitting the extension of monorails and loading hoists for heavy components. Roof design now permits a total load stress of 350 tons.

Mechanical handling received considerable attention in the new plant layout. The main overhead conveyor picks up completed engines from the ends of the four assembly conveyors, moves them on to the test beds and thence to the finishing shop. A second long monorail, soon to be installed, will carry cylinder blocks from the outside casting preparation shop into the main block, to the unloading stations at the start of the different machine lines. A third smaller overhead conveyor stores 290 machined cylinder blocks as a buffer against possible machine stoppage. Appropriate traveling transporters are used for lowering engines from track switches onto fixtures.

The P6 assembly conveyor with 39 stations at four ft, six in. intervals is now run at 6¾ ipm (max 20 ipm), while the composite P3-P4 conveyor with 25 stations moves at four ipm (max 10 ipm). Top speed of L4 line is 15 ipm.

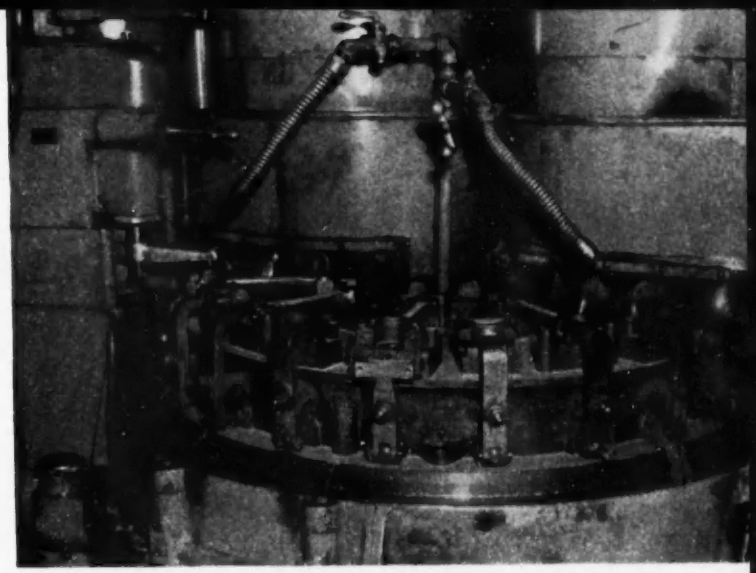
Fast return of empty pallets to the head of the assembly line is used. After the completed engine is lifted off the line at the final station its pallet coasts down an inclined track, drops onto a lower set of rails, and is engaged by a pawl on an endless belt which causes it to double back rapidly beneath the main conveyor. In this way only two extra pallets with fixtures are needed and a saving in initial outlay is effected since each unit costs the equivalent of $170.

Roller tracks with the necessary removable sections or lifting tables for maximum continuity are widely used, as are air hoists, turnover grabs, gravity chutes and elevator conveyors for broaches and other machines with high loading positions. Standard size pallets and bins have been adopted and considerable progress has been made in securing the cooperation of suppliers in delivering parts in palletized condition. Practically all transport to and from the Peterborough works is by road on flat bed trucks, and economic loading and handling is emphasized.

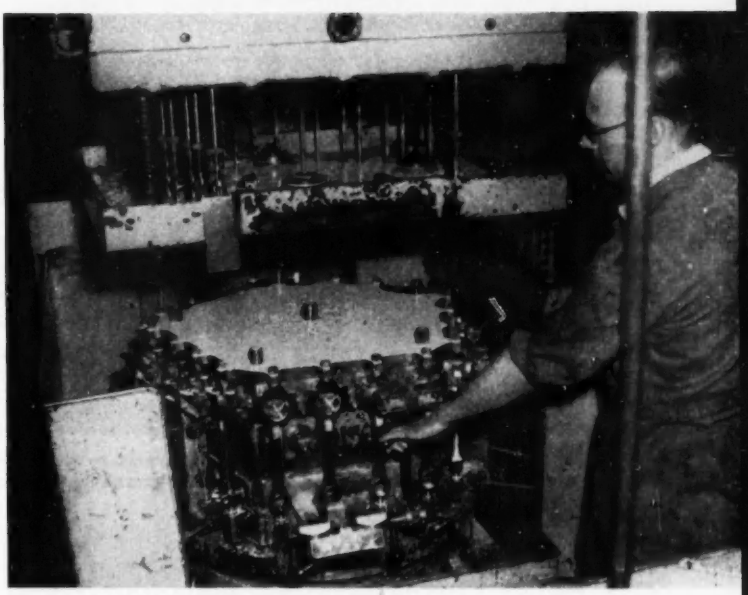
Interior flooring is of some interest. The surface is composed of impregnated wooden blocks salvaged from London streets when the latter were repaved following the recent removal of all streetcar tracks. Aside from their low cost, it is claimed that the blocks are hard wearing, absorb sound, eliminate the need for duckboards, and enable some machines to be used without being bolted down.

Economies are also made in the test shop, where power developed by engines under test on some of the beds is used to generate electricity which supplements the outside supply to the factory. The load is a 20 hp, three-phase synchronous motor which, when run at five per cent above its natural synchronous speed, acts as a generator and returns current to the 400-volt line. Conversion efficiency is stated to be 80-85 per cent, and it is reported that one-fifth of Perkins' electricity needs are obtained from this source.

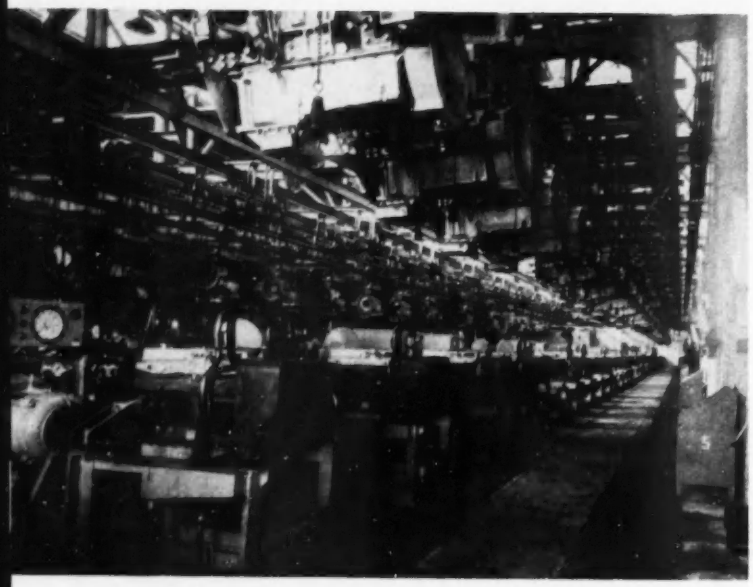
(Continued on next page)



Connecting rods and caps are loaded into fixtures of this Blanchard grinder, and are automatically clamped and face ground.



Burkhardt & Weber 32-spindle machine for drilling and reaming connecting rods and caps.



Power from some of these engines in the testing department is used to supplement the outside supply to the factory.

The motor is to be connected to the power line only within the prescribed limits of rotation, and a patented system of pushbuttons and indicator lamps simplifies this for the operator. Test runs vary from 1½ hours at light loading to six or more hours covering the full power range. The latter is carried out on a different type of brake.

Compressed air is used for a large number of applications, including overhead hoists, floating sliding fixtures, operation of height-compensating tables in roller tracks, and hand tools.

The new plant layout included some changes and improvements in service installations. Lighting was planned to give a working intensity of 25 ft candles, and is largely provided by 400-watt high pressure mercury lamps. Stroboscopic effect is minimized by connecting alternate lamps to different phases of the three-phase system. Every tenth light is a 1000-watt tungsten filament lamp which provides both a measure of color correction and instantaneous illumination when needed. Space heating is by gas, with overhead ducts distributing hot air in winter and circulating cool air in summer.

In accordance with the rigid requirements of the British Factory Act, all manner of safety devices are employed, including a variety of limit switches and mechanical and electrical interlocks on all machine tools and conveyors.

Since its founding in 1932, Perkins has aimed at popularizing the Diesel for lighter vehicles. Many of the leading British manufacturers are now supplying their trucks, buses, tractors and industrial plants with Perkins engines, and successful experiments have recently been conducted with Diesel-powered taxis in London traffic.

A number of manufacturers in Canada, Australia, France, Italy, Switzerland, Holland, Belgium and Sweden are listed as customers, and the latest export achievement has been the sale of engines to one of the biggest makers of farm equipment in Germany. Exports rose last year to the value of some $24 million, and further increases have been recorded this year.

But for all this the Perkins plant is now running at only half output, for the new production capacity has outstripped present sales. Increasing emphasis is thus being placed on service as a sales aid. Services now provided include traveling film projection units, regular information bulletins, and an engine exchange plan which at present accounts for about 400 rebuilds a month. These are offered both in Britain and, through subsidiary companies, in Canada, France, South Africa and Australia.

In addition, Perkins operates a fleet of six specially-designed mobile schools, equipped with recording and public address systems. They are used for demonstrating engines and assemblies, and have sleeping accommodations for instructors and drivers. These have traveled extensively in Britain and on the Continent, and some are now operating in Australia and Canada.

Condensed Specifications of Four-Stroke Overhead-Valve Perkins Diesels

	P3	P4	P6	L4	R6	S6
Bore, in.	3½	3½	3½	4¼	4	4⅜
Stroke, in.	5	5	5	4¾	4½	5
No. cyls.	3	4	6	4	6	6
Piston displacement, cu in.	145	192	290	270	340	450
Normal output, hp at 1500 rpm	25	32	52	48	68	75
Gross output	34 hp at 2200 rpm	52 hp at 2400 rpm	83 hp at 2400 rpm	53 hp at 1800 rpm	108 hp at 2700 rpm	89 hp at 1800 rpm
Dry weight, less flywheel, lb	517	542	896	690	914	1350

Quality Improved by Multiple Nut Runners

MULTIPLE nut runners are used in four important assembly operations at Cadillac Motor Car Division of General Motors Corp. Besides the primary objective of better quality, the use of these special tools is reported to achieve such additional benefits as greater safety on the assembly line, less employe fatigue, and easier personnel training to required quality levels.

The first multiple nut runners were put on the final assembly line several years ago. The two tools put into service at that time were Model YA5A-1 Ingersoll-Rand units; each was a five-spindle tool designed to run the five wheel nuts in a single operation. Since air line pressure may vary somewhat from minute to minute in any shop, tools were selected that would provide the desired torque at air pressures well below average shop pressure. It was then possible to use a regulator to achieve constant desired pressure at the tool regardless of fluctuations in the shop supply. In the case of the wheel nut job, the shop pressure of 110 psi was reduced to 80 psi to provide the desired 100 to 110 lb ft of torque. With the multiple nut runner all five wheel nuts are run as closely as possible to uniform torque and within the prescribed limits.

One of the most difficult nut-running jobs on the assembly line was installation of the rear spring clips. It was necessary to run four nuts on the U-bolts, pulling the plate down until it bowed evenly. At one time this operation was performed with a single air tool and each nut was run in turn. As a result, the plate cocked when the first nuts were tightened and it was difficult to get it bowed evenly. This often meant unequal loading of the bolt and uneven tightening of the springs. When a single air tool was used, additional time and labor had to be spent at the factory to bring installation of rear spring clips up to Cadillac standards of accuracy.



Four-spindle multiple nut runners are used to install rear spring clips. The tool runs four nuts simultaneously on the U-bolts until the metal plate bows evenly.

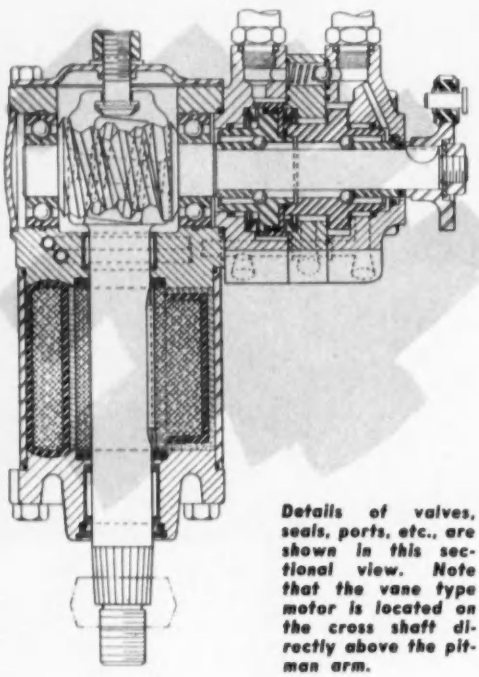
To eliminate these conditions, Cadillac turned the job over to a pair of Model YA4A-1 Ingersoll-Rand multiple nut runners. This four-spindle air tool runs the four nuts simultaneously, bowing the plate evenly and loading the bolts more equally. For this job, the 110 psi shop air is regulated to 65 psi and the tool delivers the prescribed torque of 40 to 50 lb ft to all four nuts.

The third multiple nut runner application is the bolting of rear spring shackles to the frame. Two Model YB2A-1 Ingersoll-Rand two-spindle tools are used in this operation, one on each side of the vehicle. Each tool runs two nuts at a time utilizing air regulated to 55 psi to achieve the required torque of 65 to 75 lb ft. The shackles are relatively hard to reach and it was difficult and time-consuming to position the power tool to run each of the nuts when a single tool was used. The department foreman reports that this difficulty has been largely overcome with the multiple nut runner since only one positioning is necessary and the tool is specifically designed for the job.

Cadillac's fourth use of multiple nut runners is the assembly of flywheel to crankshaft. This operation, involving the (*Turn to page* 113, *please*)

AINSWORTH'S

New Power Steering Unit Has Constant Volume Pump

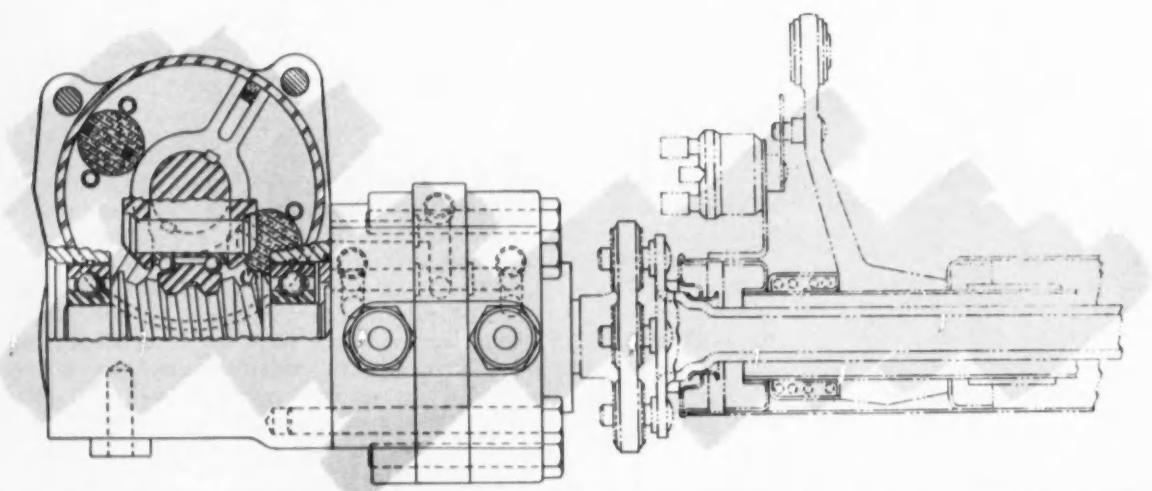


Details of valves, seals, ports, etc., are shown in this sectional view. Note that the vane type motor is located on the cross shaft directly above the pitman arm.

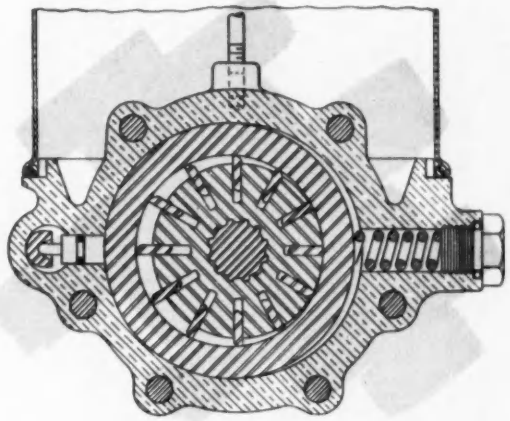
THE new Ainsworth integral power steering unit which was announced late last month (see AUTOMOTIVE INDUSTRIES, Nov. 1, page 33) features a constant output pump, a vane type motor mounted directly on the cross shaft, and provision for convenient removal or replacement. Total weight of the power steering unit and necessary parts to attach it is approximately 40 lb.

Figure 1 shows arrangement of the 2¼-in. diameter poppet type valves which require only 0.007 in. travel either side of neutral to completely close them. Valve opening is equivalent in area to a hole 11/32 in. in diameter. Also shown in the figure is the location of the vane type motor.

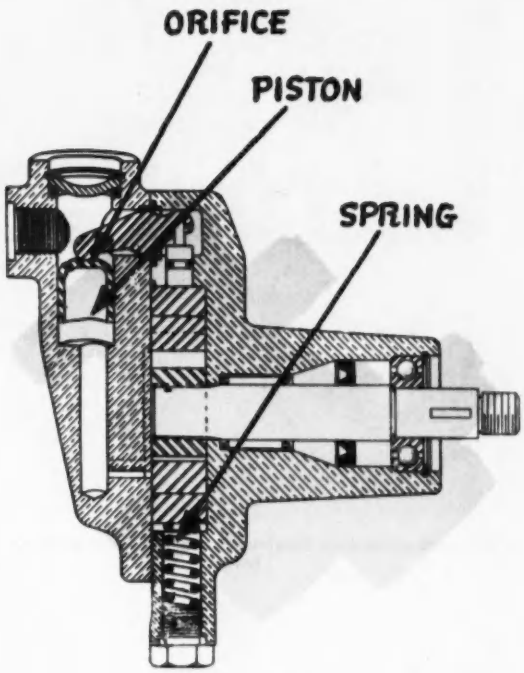
Attachment of the unit to the steering column shaft is shown in Fig. 2. Disconnecting the flexible coupling enables the power unit to be removed without disturbing wiring or transmission controls. According to the manufacturer, complete removal or replacement can be effected in 20 minutes. Space required is only slightly more than needed for manual steering equip-



A flexible coupling permits easy removal of the power unit for service. The vane type motor is shown in section at the upper left in the illustration.



Transverse sectional view of the pump which delivers 1½ gpm whether at 400 or 4000 rpm. Shifting ring is shown in position for greatest volume.



Arrangement of parts which hold output of pump to not more than 1½ gpm regardless of the speed of the pump.

ment. A transverse section of the motor is shown at the upper left of Fig. 2. The design is such that road shock is taken directly by the motor.

The pump, which was designed by Ainsworth engineers specifically for power steering, delivers 1½ gpm whether at 400 or 4000 rpm. As shown in Fig. 3, a shifting ring can be moved automatically into a more nearly concentric position at higher speeds to keep the pump discharge at the desired volume.

Eccentricity of the shifting ring is controlled by the mechanism illustrated in Fig. 4. When increased revolutions try to force more than 1½ gpm through the orifice, pressure builds up behind the piston which actuates a small lever. The lever, in turn, moves a plunger that rests against the shifting ring, forcing it into a more nearly concentric position. When the volume drops because of lower pump speed, a spring shifts the ring into a more eccentric position to increase the pump output per revolution.

Implications of Chrysler-Briggs Purchase

CHRYSLER Corporation's agreement to purchase Briggs Manufacturing Co. is another move by the company to position itself for the stormy competitive battle shaping up.

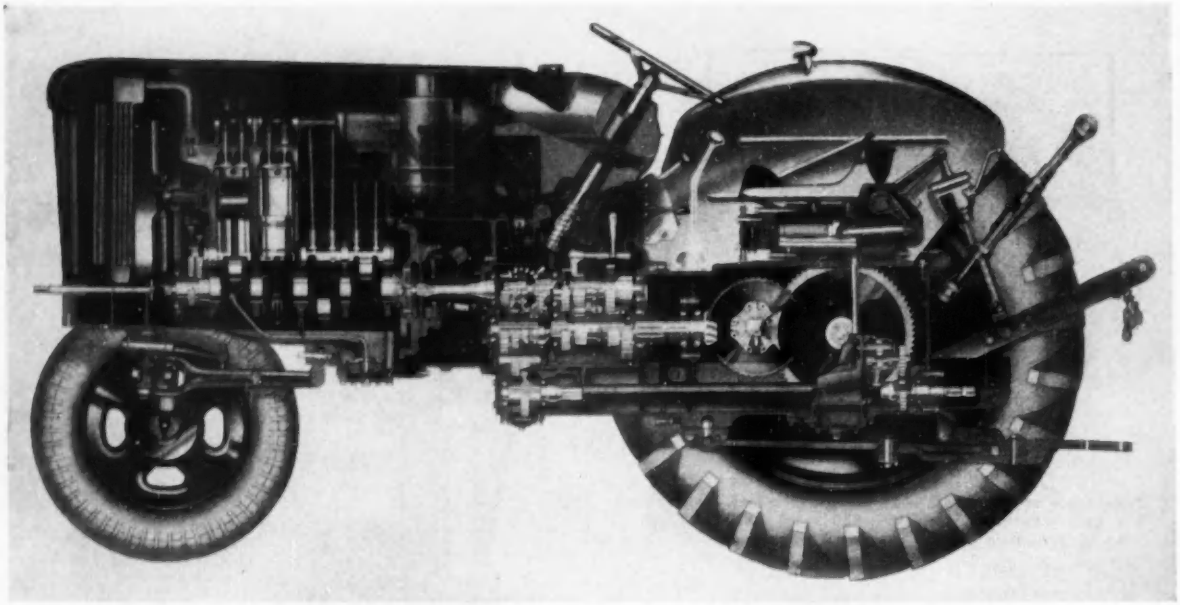
The purchase will not only strengthen Chrysler in its competition with General Motors and Ford, but it will also pose a problem for the independents, since acquisition of the Briggs facilities will widen the gap between Chrysler and the smaller companies. There is a growing opinion in Detroit that integration of the smaller independent companies into some kind of a working combination will now become more imperative than ever.

Packard is most directly affected, since its bodies have been supplied by Briggs and undoubtedly it now will have to find some other source. Both Chrysler and Briggs, however, have assured Packard that it will be given ample time to line up a new source of supply.

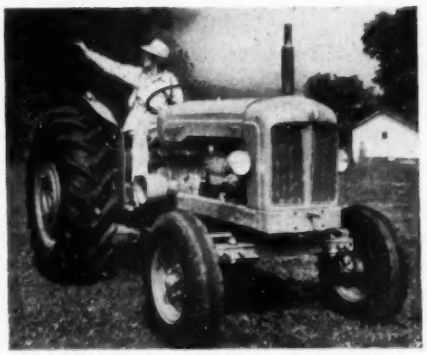
Included in the $35 million purchase are 12 plants, with machinery and equipment. This price does not include certain inventories which Chrysler has agreed to buy. Ten of the plants are located in Detroit and one each in Youngstown, O., and Evansville, Ind. Not included in the purchase is the Briggs Beautyware Div., which has four plants. The 12 plants being taken over by Chrysler have a total of more than 6.6 million sq ft of floor space and employ about 40,000 persons which will bring Chrysler's total employment to approximately 165,000. Some of the production facilities are extremely modern since Briggs spent more than $8 million last year on new plants and equipment. Acquisition of the

(*Turn to page* 146, *please*)

By Leonard Westrate



Cutaway view showing construction of the Ford Major Diesel farm tractor.



Details of
New Fordson Tractor

FOLLOWING the recent news announcement (see AUTOMOTIVE INDUSTRIES, Sept. 1, page 34) issued by the Ford Tractor Div., Ford Motor Co., this article provides some specific details of the Fordson Major Diesel farm tractor. Starting in September, 1953, these tractors, manufactured by Ford Motor Co., Ltd., Dagenham, England, are being imported for sale in the USA and will be marketed by the Ford Tractor Div., through its dealers. For the present distribution will be limited to ten western states and southwestern states where there is need for large, powerful tractors capable of handling three to four plows.

As illustrated, the tractor weighs 5600 lb with standard equipment, including 600 lb rear wheel weights, fuel, oil, and water. It has a wheelbase of 80 in., overall length of 130½ in., and overall width of 85 in. (max.). The front tread is adjustable in four-in. steps from 50 to 74 in.; rear tread is adjustable from 52 to 72 in. on the model FMD-11, fixed at 58 in. on the FMD-14.

Both models come equipped with built-in hydraulic system, three-point linkage for rear attached equipment, adjustable swinging drawbar, sealed-beam headlamps, 12-volt starter, electrical equipment, standard power take-off, individual rear wheel brakes and brake lock, and other items. In addition, an automatic clutch release arrangement which comes into play when a mounted implement strikes an obstruction is offered as optional equipment.

Needless to say, one of the noteworthy features of the tractor is the Fordson Diesel engine, which has been in production since the end of 1951. It is a four-cylinder, full Diesel with overhead valves, having the following mechanical specifications:

Bore	**3.937 in.**
Stroke	**4.524 in.**
Displacement	**220 cu. in.**
Compression ratio	**16 to 1**
Drawbar (calculated)	**36.29 hp**
Belt (calculated)	**40.58 hp**
Drawbarpull (max.)	**5315 lb at 1.73 mph**
Fuel consumption	**0.454 lb; hp hr (max load test)**

The engine is fitted with wet cylinder sleeves; domed head, low expansion aluminum alloy pistons with three compression and two oil control rings; and dynamically balanced five-bearing crankshaft. Main and connecting

(*Turn to page* 113, *please*)

Miller HIGH PRESSURE HYDRAULIC CYLINDERS

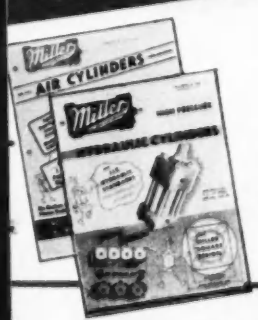
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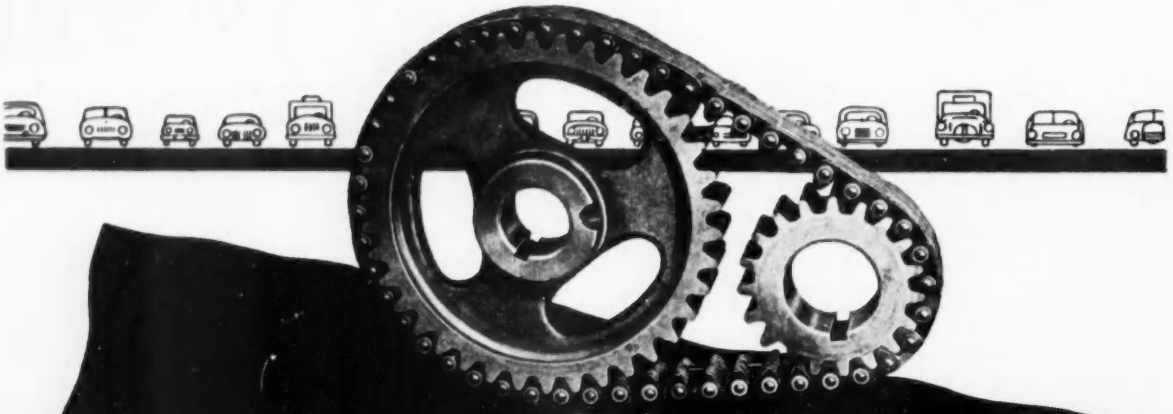
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Bow in bushing acts to keep a snug joint.

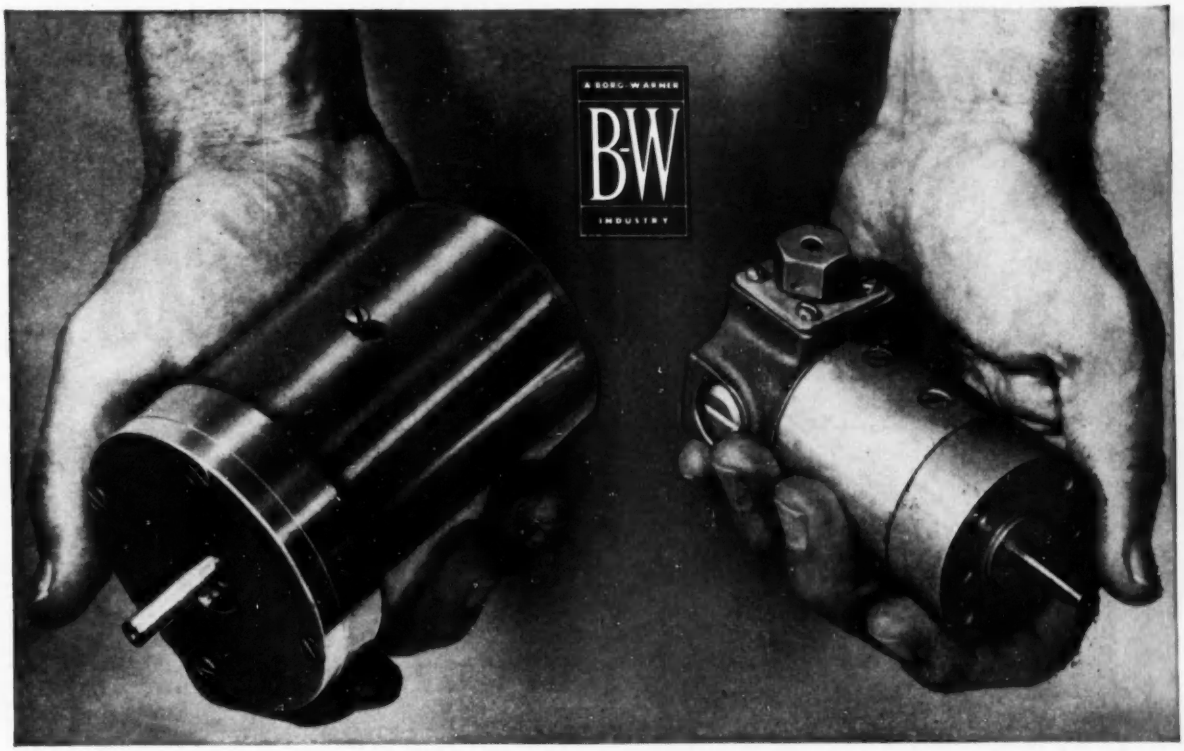
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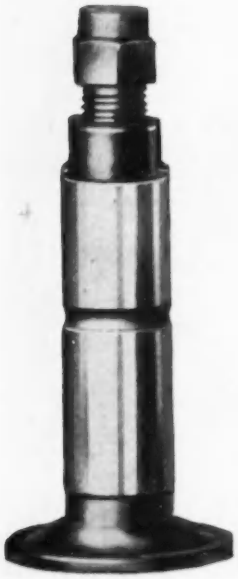
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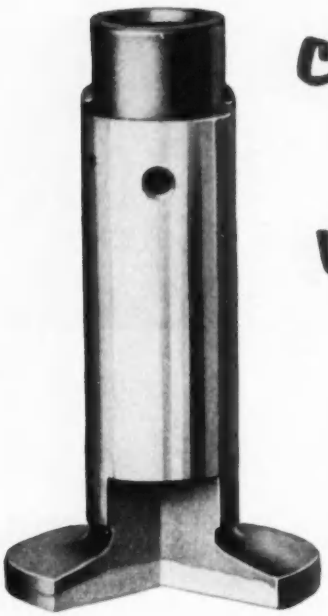
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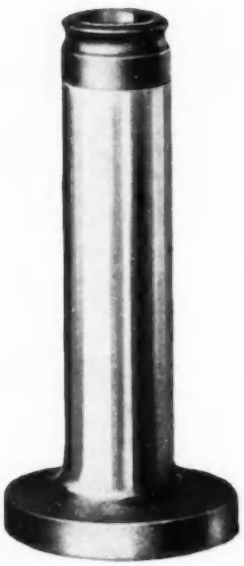
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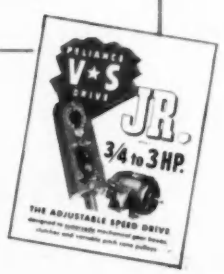


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Ask for Bulletin D-2102. It describes and illustrates features, applications, components and operation; dimensions and characteristics also are included.



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News of the MACHINERY INDUSTRIES

By Thomas Mac New

Elimination of Dual Electrical Standards Advocated at AIEE Conference. Suggestions Made for Advancements in Design of Equipment.

AIEE Conference On Machine Tools

The recent American Institute of Electrical Engineers' Sixth Annual Conference on Machine Tools held in Cleveland enjoyed a record registration. Eleven technical papers were presented to provide the attending engineers with up-to-date information on new products, processes and techniques. In addition to the technical sessions, plant tours were scheduled to the Ford Cleveland Engine Plant, Warner & Swasey Co., Reliance Electric & Engineering Co., and Chevrolet Transmission Plant.

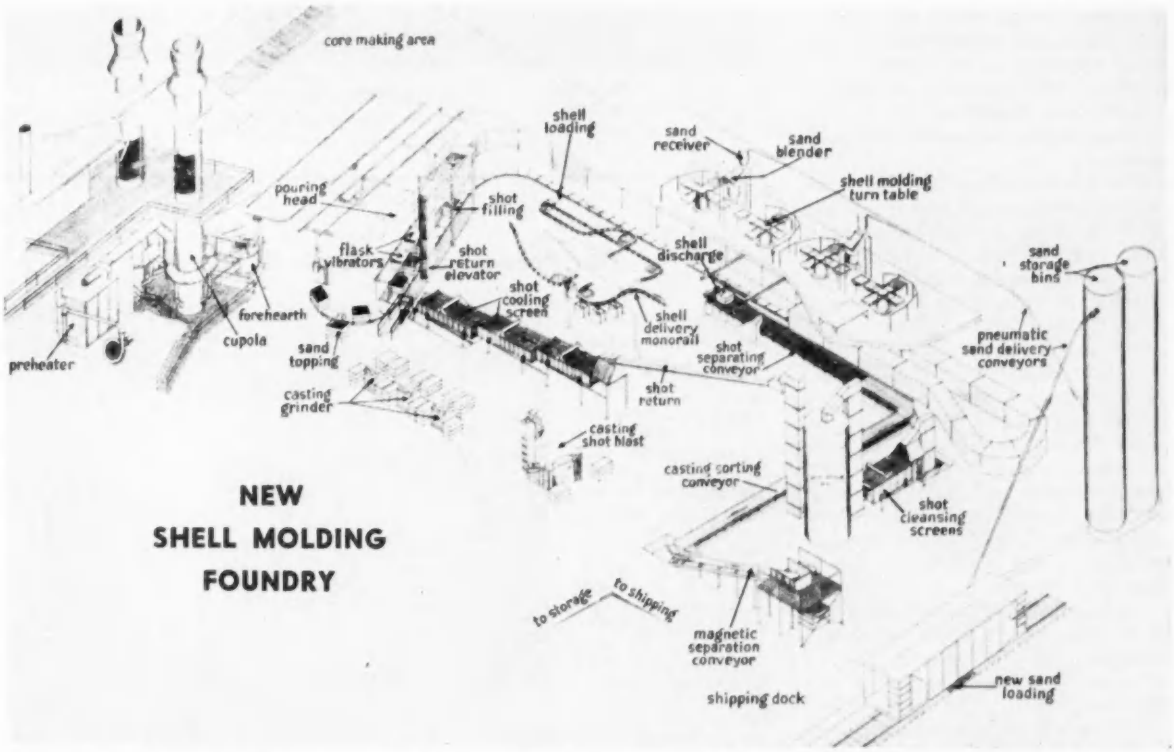
One of the features of the three-day meeting was the address by Frederick S. Blackall, Jr., president and treasurer of Taft-Peirce Manufacturing Co., and president of the American Society of Mechanical Engineers. He stated that improved design and cost reduction are paramount obligations to maintain industrial leadership. "The benefits of the joint standards developed by our engineering societies in cost reduction, simplification, improved design and interchangeability of product, not to mention their great gifts to public safety and the national defense, are immeasurable," he said.

Mr. Blackall deplored the present duality of electrical standards in the machine tool field due to the parallel development of Electrical Standards by the Joint Industry Conference and the National Machine Tool Builders Association. He called on technical staffs of machine tool consumers and machine tool builders to join in eliminating this situaion which is wasteful and costly to builder and consumer alike.

Machines for Aircraft

W. L. Davis, electrical supervisor, Douglas Aircraft Co., Inc., El Segundo Div., reflected the machine tool electrical experience of the plant engineering and maintenance departments in one of the technical papers presented at the AIEE meeting. He made several suggestions concerning the

(*Turn to page 96, please*)



Lynchburg Foundry Co., Lynchburg, Va., has designed the foundry pictured here to produce approximately 100 tons of finished mold castings per day. The plant can produce individual shell molded castings weighing up to 100 lb. Castings will be made of gray iron or ductile iron dependent on customer's specifications. Available shell sizes are 18 in. by 24 in., 20 in. by 26 in., 22 in. by 28 in., and 24 in. by 30 in.

EQUIPMENT PLANT • PRODUCTION

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73

Improved Horizontal Shaving Machine Has Two Heads

An improved model GCK-96 Red Ring horizontal precision gear shaving machine for spur, helical and herringbone gears from two to 16 diametral pitch having pitch diameters from 24 to 96 in. is announced.

Among the improvements on the precision machine are two cutter heads, rapid traverse feeds on both heads, and redesigned controls. The machine is equipped with a flexible work driver and adjustable bearing pedestals which permit large gears to be shaved by the rotary crossed axes principle while mounted on their journal bearings as they will run in the equipment installation.

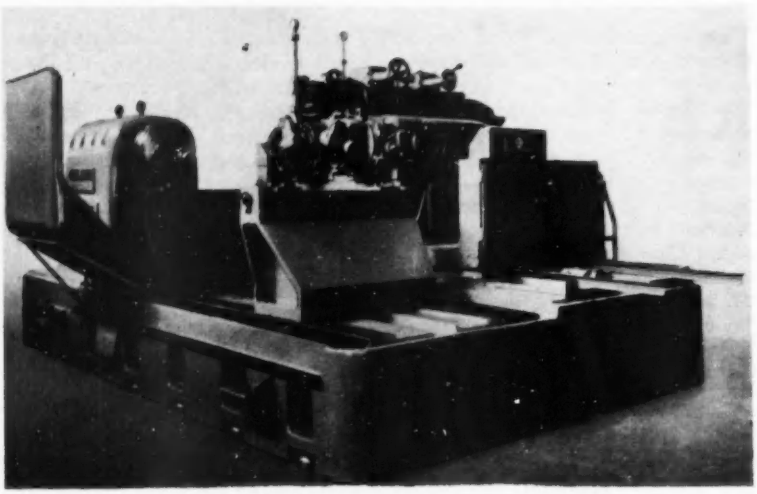
Maximum stability and minimum deflection of the cast iron machine bed, which must support gear assemblies weighing up to 26,000 lb, is achieved by providing a heavily ribbed, rigid design that is in compression loading as result of the gear weight.

The work platform on which the operator stands to set up and run the machine rides on individual rails, thus avoiding deflections in the machine saddle ways that can affect gear shaving accuracy. The platform is attached to the saddle through spring and rubber connectors.

A journal alignment checking bar is mounted in a slide in the saddle supporting the two cutter heads, to check the alignment of the gear journal bearings in both horizontal and vertical planes. Indicators for setting the cutter head crossed axis angle are provided in each cutter head. A cutter rotation inching lever is provided in each head.

The shaving machine will accommodate cutters up to 12-in. diameter. Maximum shaving range of the machine is 111 in. The length from the headstock to the end of the work bed is 170 in. It weighs approximately 150,000 lb. An integral coolant pumping system is included with the machine. *National Broach & Machine Co.*

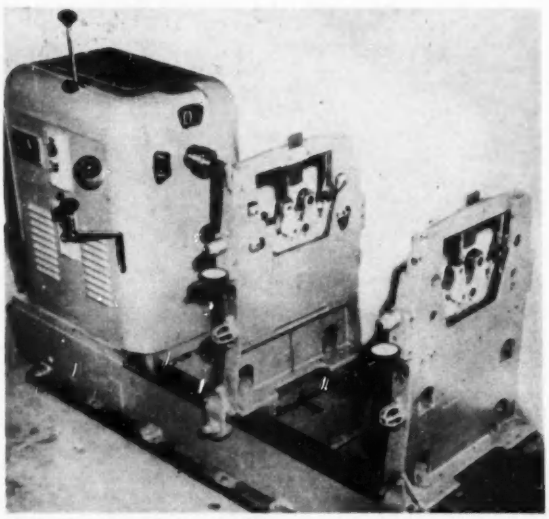
Circle 66 on page 73 for more data



The Model GCK-96 Red Ring horizontal gear shaving machine.

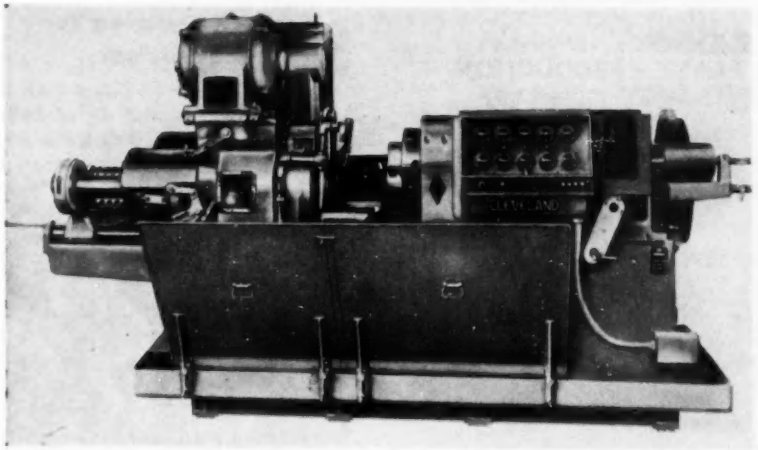
For Production Dynamic Balancing

Model 353-R dynamic balancing machine specifications include a shaft diameter range of ½ in. to 5 in., weight capacity of 10 to 600 lb, 40 in. swing diameter capacity, and extra bed length in sections of the bolt-on type. Dual pick-up controls (automatic and manual for production and laboratory balancing), dual number drum openings for either vertical or horizontal correction, and redesigned flexing head and roller assemblies promote greater universality in the machine. Standard and special speeds are available. Bear Mfg. Co.



Circle 67 on page 73 for more data

Two Automatics Offer Choice of Feed Drive



The Cleveland AB Automatic with electric feed drive.

Two automatic screw machines, both of 4¼-in. capacity, differ in the type of feed drive. The model AB is equipped with electric feed drive which provides separate, infinitely adjustable forward and return motions of each of the five turret stations. This drive is controlled by ten dialed rheostats and a rotary timing switch with ten selector contacts. In setting up, when spindle speeds have been set and the desired rate of feed for each tool determined, the operator refers to the conveniently located feed chart which gives him the proper dial setting for each rheostat. Then, setting the feeds becomes as simple as tuning a radio.

The model AW provides variable forward and return feeds through an improved, simplified mechanical drive. An independent motor furnishes the power and drives through a friction drive unit. Changes of feed are automatically controlled by adjustable steel cams on the regulating wheel. Adjustable trip pins govern the length of feed for each tool and make it possible to return the turret in idle motion when return feeds are not required.

The forged steel spindle is mounted on precision bearings. Fifty-six spindle speeds are available ranging from 21 to 648 rpm and there are four automatic speed changes for each speed range made possible through the four-speed spindle motor. A hand shift clutch provides two speed ranges for each set of change gears. Indexing is accomplished by the use of a geneva indexing mechanism. Stock feed stroke is 14 in.

Separate front and rear cross slides are independently operated by separate cam drums. The slides have wide flame hardened tool surfaces.

The length of stock feed is easily pre-set by a simple hand crank adjustment and registered on a scale. The feed tube is easily removed for changing feedshells and the draw-in type master collet takes the maker's quick change collet pads. A motorized chip conveyor is available. *The Cleveland Automatic Machine Co.*

Circle 68 on page 73 for more data

Compacting Press

A multiple action compacting press, designated the model "C", is claimed to be the first press of its type specifically designed for the compacting of powdered metals. An exclusive feature claimed for the new design is an arrangement which allows quick, accurate adjustment for changes of density or weight while the press is in operation.

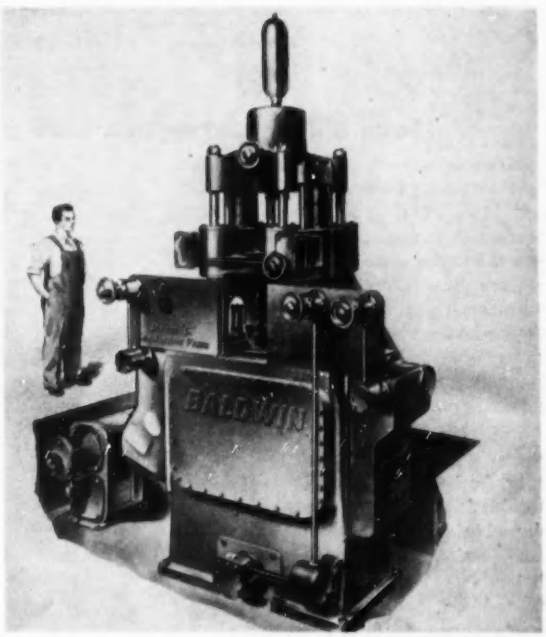
Other exclusive features include a hydraulic head, floating die holder, independently floating core rod, shuttle type feeder, automatic lubrication, and a choice of five different cycles.

Rated pressure is 100 tons. It is a mechanical, four column, crank type press equipped with a flywheel, pneumatic clutch and brake. It is powered by a variable speed drive unit wih a 20-hp totally enclosed motor. Speed is four to 24 strokes per minute.

The hydraulic head makes it possible to accurately control the pressure being applied. Die holder and core rod float independently of each other against pneumatic cushions. Positive adjustable stops control the distance of movement. An auxiliary stationary core rod also can be used.

The shuttle type feeder carries the same volume of material over the die cavity each time. *Baldwin-Lima-Hamilton Corp.*

Circle 69 on page 73 for more data

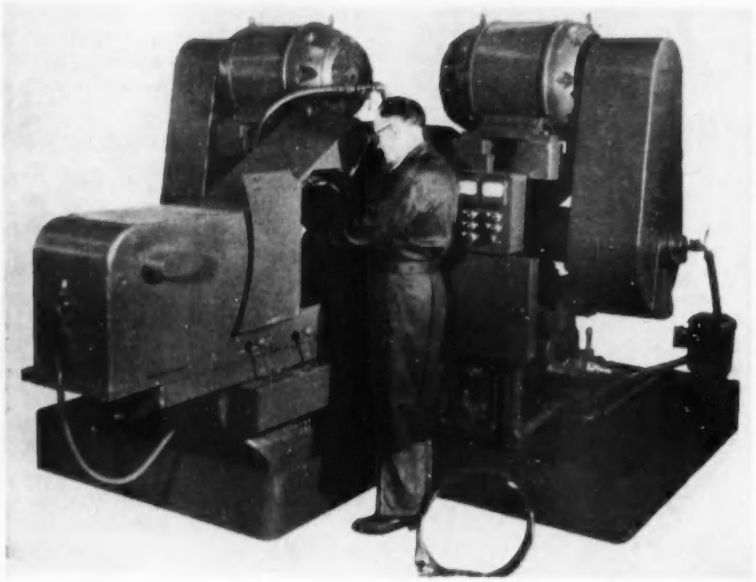


B-L-H compacting press.

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 73

Double Spindle Grinder

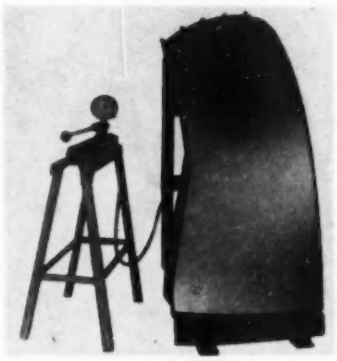


The equipment includes hydraulic head closing attachment complete with controls, hydraulically operated sliding work table with controls, wet grinding system, and rotating type fixture to accommodate, in this case, an above size brake band. Anti-friction bearings are used and special provision is made to exclude dirt and grit from the bearing chambers. The spindles are driven through V-belts from motors mounted directly above upon hinged motor plates. Heads are hydraulically operated. Two 40 hp, 1800 rpm motors power the unit. Production is 30 to 40 pieces per hour. Gardner Machine Co.

Circle 70 on page 73 for more data

Stretch Forming for Magnesium

A magnesium stretch forming press is available with a shell die of 0.074 to 0.125 in. sheet steel, with thermostatically controlled heat. It takes up



approximately two by three feet and weighs approximately 300 lb. Dies are said to cost less than half of the conventional stretch press dies. Shell dies are made from a wooden mock-up or a sample of a perfectly hammered skin that has been checked to craft.

One operator handling several machines produces 20 to 30 pieces a day on each die. Reports indicate aircraft doors and panels are being made to 0.04 in. thickness stretched over the 0.074 in. steel dies, with the skins retaining structural strength. There is said to be no limitation to the size of the sheet as machines can be made to any size or shape. *R. A. Lalli Co.*

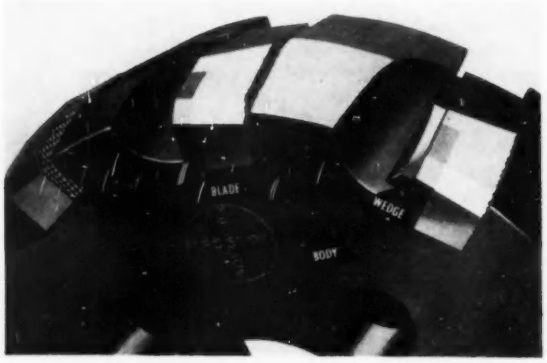
Circle 71 on page 73 for more data

Face Milling Cutter and Shell End Mill

Kroslok is the name of milling cutters introduced recently. Three basic members compose Kroslok: body, blade and wedge. Cross serrations on one side of he body channel mate with similar cross serrations on the blade assuring rigid holding of the blade in the body. The wedge is driven between the smooth side of the body channel and blade after the cross-serrated pattern is mated.

Two basic types of bodies are offered: general purpose and heavy duty, for both ferrous and non-ferrous applications. Weight distribution design obtains a flywheel effect. Heavy construction is said to prevent body distortion. A chip groove keeps chips cleared from the work. Bodies are precision-machined, heat-treated alloy steel. Right-hand and left-hand bodies and blades are offered. Blades available are high speed steel, and cemented carbide-tipped. Blades are interchangeable within respective body types. Diameters range from 3 in. through 24 in.; special sizes available. *The Motch & Merryweather Machinery Co.*

Circle 72 on page 73 for more data



Construction of the M & M cutter.

Precision Boring Machine for Production of Small Lots

The 998 boring machine is for precision boring, precision drilling, straight or contour turning and boring, facing and grooving especially where fine finish and high production are desired. It can be tooled either as a single purpose machine for quantity production or for miscellaneous work in small lots.

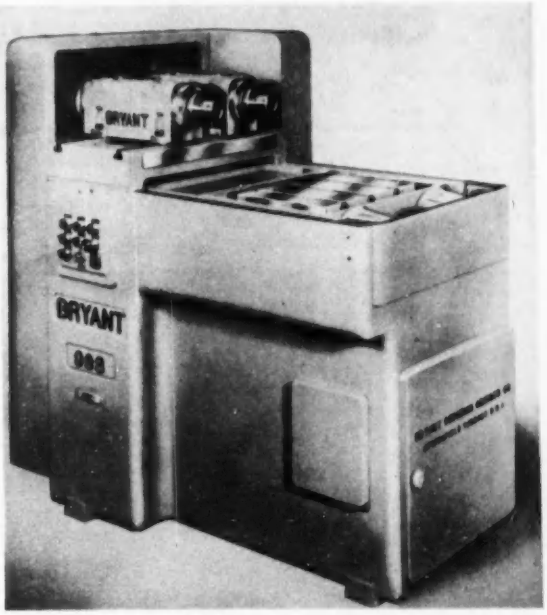
Bed, bridge, heads and table of the machine are Meehanite castings. The table moves on preloaded ball slides and is mechanically actuated by a simple cam and lever unit.

Cams and change gears are easily accessible for changing either the length of the stroke or the rate of travel. The motors for driving the cams and the boring heads are mounted in an accessible recess inside the bed, thus keeping floor space to a minimum. The recess is fan ventilated.

Ample fixture mounting surface is provided on the table, which measures 17½ inches by 22 inches. The table has three ½ inch T-slots, and can accommodate a wide variety of fixtures.

Brakes, motors, air cylinder, bearings, pneumatic follower system, lubrication hoses and all electrical apparatus are stock items. Either low or high pressure coolant systems are available. All electrical equipment conforms to J. I. C. standards. *Bryant Chucking Grinder Co.*

Circle 73 on page 73 for more data



The Bryant precision boring machine.

Lathe Tracer

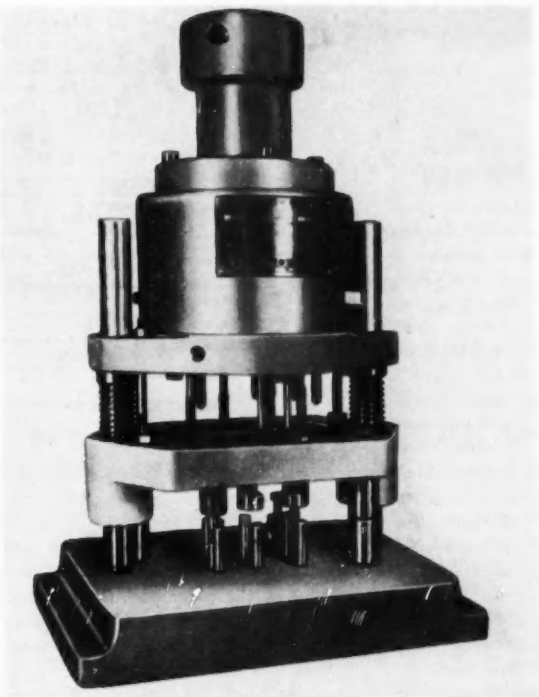
A Type C rigid air-gage tracer for application to model EE sensitive precision toolmaker's lathe and model EE precision manufacturing lathe is announced. It supersedes the type B tracer mechanism formerly furnished.

All model EE machines equipped with this tracer are powered by an exclusive electronic drive, resulting in minimum vibraton at all speeds due to the absence of rotating elements in the power supply to the drive motor. Maximum diameter change at one setting of the slide is three inches.

Feed range of the hydraulic slide, set at 45 deg, is such that perfectly square shoulders may be turned. The tool, mounted on its own slide, can be adjusted for diameter changes without altering the template or tracer setup.

Either flat or round templates may be used. *Monarch Machine Tool Co.*

Circle 74 on page 73 for more data



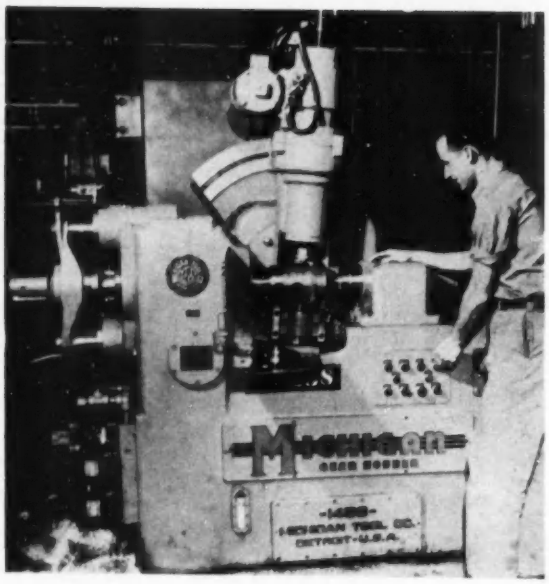
Drill Jigs

Self - clamping drill jigs to be used with gearless multiple spindle drill heads can be used to perform drilling, reaming and tapping on standard drill presses and tapping machines. Four types accommodate various sizes of work pieces, handling hole patterns from 3 in. to 15 in. in diameter. Self-clamping is accomplished by the downward stroke of the drill press spindle exerting force on the drill head, which in turn transmits the force to the bushing plate. The bushing plate locates the work piece, which then is firmly clamped by springs between bushing plate and drill head. Continuing its downward progress, the drill head completes the drilling, reaming, or tapping operation and then is retracted. Thereupon the head releases the force on the springs and the part is automatically unclamped. Zagar Tool, Inc.

Circle 75 on page 73 for more data

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 73



The Michigan gear hobber.

Hobber Is Flexible

A high production gear hobber is reported to offer the added advantage of quick changeover to handle a variety of parts.

To make a change from one spur gear to another or different diametral pitch and number of teeth, all that is required is the removal of the hob and the replacing of the proper ratio gears, and the removal and replacing of the hob speed gears, if necessary. The fixtures are then taken off and replaced with the next set by the removal and replacing of four bolts each on the headstock and tailstock. Spacers on the yoke ends are changed if it is necessary to change the relation of the gear to the hob. All that remains is for the operator to adjust the infeed, set the crossfeed limit switches, and check the depth of cut.

Changeover time is approximately forty-five minutes. The maker states this could be reduced slightly on small parts by mounting the parts on an arbor; then all that is necessary is the changing of the hob, the ratio gears and possibly the hob speed gear. *Michigan Tool Co.*

Circle 76 on page 73 for more data

Heat Treating Furnace

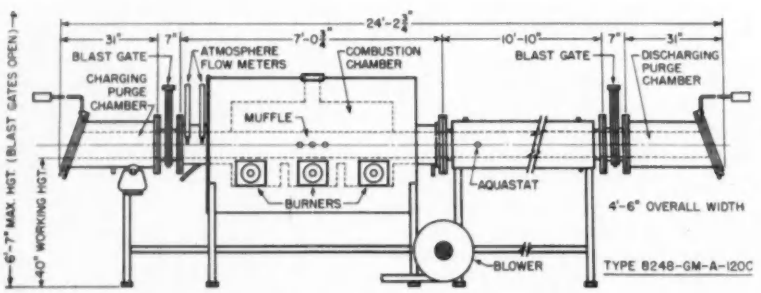
Now offered is a stainless steel heat treating furnace to bright harden and bright anneal stainless steels and other high alloy metals with no oxidation or discoloration. No additional operations are necessary. It can also be used for copper brazing of stainless steels.

The atmosphere in the work chamber is controlled so that it is not contaminated while in the furnace from either oxygen or water vapor which oxidize stainless steels. Purging chambers are located at both the charging and discharging ends and are separated from the rest of the unit by doors.

A full muffle prevents contaminations of the atmosphere from the combustion products of the burners. Burners are arranged to give quick heating and maximum uniformity of heat throughout the work basket.

Parts are cooled rapidly in a water-jacketed cooling chamber after heat treatment while still under the protection of the atmosphere. The water temperature of the jacket is automatically controlled by an aquastat.

Work is placed into the charging chamber with the inner door closed. All air that has entered the chamber is completely purged before this door is opened.

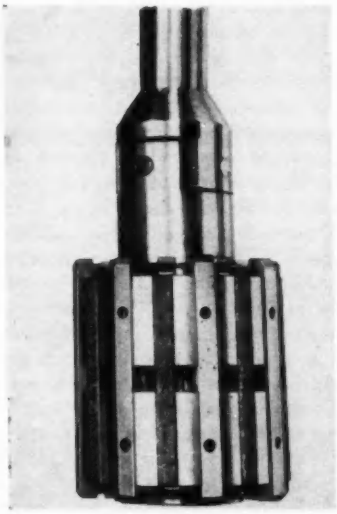


Lindberg heat treating furnace for stainless steels.

Without reopening the charging door, work is pushed into the high heat chamber by means of a pusher rod inserted into a hole in the charging door. The inner door is then closed and work brought up to the proper temperature. The load is discharged in a similar manner. *Lindberg Engineering Co.*

Circle 77 on page 73 for more data

Honing Tools and Stones



Production honing tool and deep stone.

Three lines of production honing tools have been announced recently. A production honing tool and deep stone is of the flange type with the slots in the flange supporting the stone for the full length. Called Plas-T-Clad, the honing stone is supported by a steel holder which transmits the expansion pressure to the stone through precision machined surfaces. Protective material covers the sides of the stone and extends down to provide a holding skirt. The stone is mountable and demountable in seconds.

The H-S (slotted-body) tools feature direct body support of the stone near the cutting face and the Full Support of expansion pressure to the stone by the wedge. The Barnesdril Plas-T-Clad abrasive stones are supported on the sides and ends by the tool body. A high percentage of the use of the full depth of the honing stone is possible with this design where the side support is stationary and the expansion support moves as stone is expended. Protective material covers the sides of the stone to prevent spalling. The stone assembly is quickly loaded and unloaded.

The general purpose honing tools feature a quick clamp stone holder which accommodates the Plas-T-Clad abrasive with interchangeable oversize holders to vary the diameter that can be honed with each tool body. The quick clamp stone holders accommodate abrasive sticks which have had protective material added to the sides. A simple clamp arrangement is incorporated into the holder for quick changing stones. End thrust is taken by the holder. Expansion pressure is exerted on the stone through the precision machined hard steel holder. The protective material on the stone at the cutting edge prevents the stone from spalling. *Barnes Drill Co.*

Circle 78 on page 73 for more data

Solenoid Operated Valves

Designed as companion valves to the larger, pressure-operated, solenoid-controlled, four-way Pilot-Master valves, P-M series BB-2 and BB-4, two new ¼ in. four-way poppet-type valves in the P-M line are announced.

Designated as P-M models CC1-25 and CC11-25, the new valves are direct solenoid operated, extremely compact and simple, and recommended for speeds as high as 600 cycles per minute. Their principal use is expected to be for the electric control of small, double-acting air cylinders on short stroke, high speed applications. Examples are switching mechanisms for conveyors, welder cylinders, and clamping and work-positioning cylinders on various automatic and semi-automatic machines.

Model CC1-25 is the single-solenoid model, and the single valve stem, which is the only moving part, is spring returned. Model CC11-25 has two solenoids, and its single valve stem remains at either end of its short stroke until the other solenoid is momentarily energized to return it. This makes "momentary contact" operation possible, eliminating the necessity, with a single-solenoid valve, of keeping the solenoid energized as long as it may be desired to hold the valve in its shifted position. The need for a holding relay is eliminated with this valve, and it also eliminates the danger that a cylinder might reverse accidentally and either damage the work or injure the operator in the event of an electrical power failure. *Hannifin Corp.*

Circle 79 on page 73 for more data

Three Materials Handling Aids for Use with Fork Lift Trucks

Dump Attachment

A hydraulic dumping attachment for Yale fork trucks has been announced.

Designed for use with drop bottom boxes, the attachment hydraulically raises the rear end of the box through a hook engagement independent of fork action. Since the forks and the front of the box bottom are at the same height while dumping the load, the exact spilling position can be maintained at all times and the load can be raised to maximum height of the lift.

The lifting hook is adjustable and can be used with both 11 cu ft and 15 cu ft boxes. Hooks for other boxes can be furnished and are interchangeable with the standard lifting hook. *Yale & Towne Materials Handling Div.*

Circle 80 on page 73 for more data

Self-Dumping Hopper

A self-dumping hopper with a specially designed base that permits moving with either a jack-tongue or a fork truck is now introduced. The machine worker can move the hopper as he needs it, without waiting until a lift truck is free, by inserting the jack-tongue in the socket on the special base of the hopper and wheel the loaded container to the desired place, replacing it with an empty hopper. This feature, obtained by adding wheels to the special stationary base, is available with hoppers of ½-yard to two-yard capacity. *Roura Iron Works, Inc.*

Circle 81 on page 73 for more data

Die-Handling Pusher

Dies weighing up to 3200 lb can be handled quickly and easily by a high lift platform truck equipped with a die handling hydraulic pusher attachment. The device has double acting cylinders so that dies can be pushed off the slider or pulled on to it.

A slide bar located at each side of the slider bed insures straight and even motion. The control handle for the pusher attachment is located at eye level. *Yale & Towne Materials Handling Div.*

Circle 82 on page 73 for more data

NEW EQUIPMENT — PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 73

Flat Box Marker

A new marking machine for printing on flat folding boxes, corrugated cartons, plastic panels, abrasive stones and other flat objects up to ¾ in. thickness, has just been announced. Objects to be marked are automatically fed into the machine, printed and ejected at a rate of 80 imprints per minute.

The machine, designated model 45AE, adjustable side gages to accommodate objects up to 5 in. by 14 in. The maximum imprint area is 2 5/16 in. by 6 11/16 in.; the imprint may be located anywhere in an area 5 in. x 11 in. Maximum thickness of objects to be marked is ¾ in. *Markem Machine Co.*

Circle 83 on page 73 for more data

High Speed Bit

The addition of ground high speed steel tool bits to a line of cutting tools has been announced. Known as Bonus Bits, they are available as finish ground bits in 10 sizes of squares from 3/16 in. to 1 in., accurately ground to 0.001 in. for ease in alignment.

Made from a molybdenum-tungsten alloy, the bits are said to have excellent red hardness characteristics, resistance to abrasion and unusual toughness. *Besly-Welles Corp.*

Circle 84 on page 73 for more data

Brush for Holes

A horsehair brush for cleaning leader-pin holes in die sets helps to maintain die accuracy and lengthen the life of die sets. Bristles are laid uniformly, trimmed for proper stiffness, permanently locked in the twisted wire handles so they cannot work loose. Bristles are resistant to acids and alkalis common to oil, naphtha, detergents and industrial cleaning fluids. As the bristles wear, the brush may be used for smaller and smaller leader-pin holes until it is completely worn out.

Leader-pin brushes are available in bristle diameters of ⅞ in. to 2¾ in. and measure approximately 10½ in. over all. *Biltwell Brush & Mfg. Co.*

Circle 85 on page 73 for more data

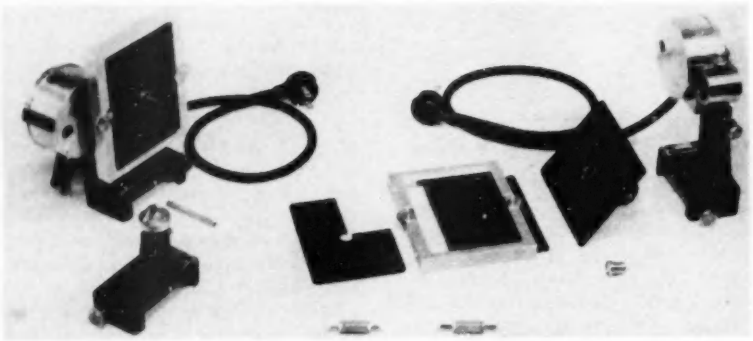
Flat Plate Camera

A flat plate camera, designed espécially to provide a high degree of utility in meeting present-day needs of X-ray diffractionists, is now on the market.

The unit can be used for investigations which cannot be handled effectively with a powder camera or a diffractometer. It is useful for Laue work, or with monochromatic or filtered radiation, depending upon problem requirements. Its major application is in the study of metals, but it is also useful for powdered materials, plastics and to a degree for semi-solids and liquids.

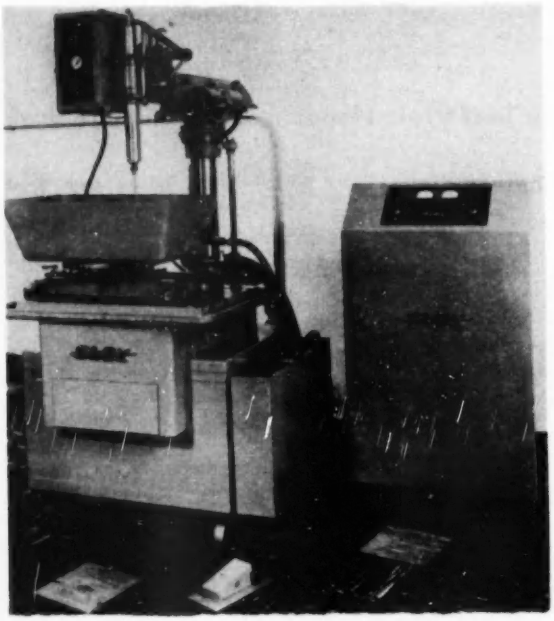
The flat plate camera comprises three elements: 1. A stationary specimen mount accommodating not only planar sections of metals, crystals, compacted powders or plastics but also wires, organic or inorganic fibers, powder specimens mounted on fibers, or powders or liquids in capillary tubes. 2. A combination collimator mount and motor rotated back-reflection cassette. 3. A forward reflection cassette which can also be utilized as a specimen support, with motor drive for rotation. *North American Philips Co., Inc.*

Circle 86 on page 73 for more data



Norelco flat plate camera.

Electrical Discharge Machine



Called the M-400, an electrical discharge machine features a completely new power supply specifically engineered for precision tool and die work. The unit will, with extreme accuracy, drill shaped and round holes in tungsten carbide and regular tool steels. It has also been used on die-sinking operations such as extrusion dies, cold header dies, etc. Materials used in such cases being tungsten carbide. Elox Corp. of Michigan.

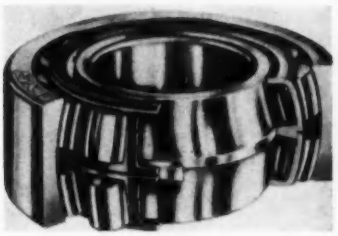
Circle 87 on page 73 for more data

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NEW PRODUCTS

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Spherical Bearing Takes Increased Loads



Increased anti-friction bearing capacity of from 25 to 50 per cent, and service life two to 3½ times longer than formerly possible, is claimed for the C type series 222 and 223 spherical roller bearings without any change in size or weight. The inner race is without undercuts and integral flanges. Longer rollers are used. A separate guide ring, between the two rows of rollers, allows them to take the position which their contact with the rings dictates. Load distribution is uniform at all times. *SKF Industries, Inc.*

Circle 26 on page 73 for more data

Power Steel Control Gives Driver Selection

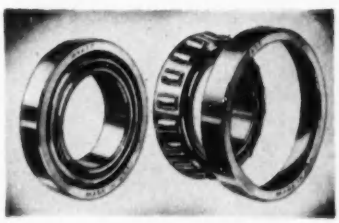


A control valve that permits truck operators to select the degree of steering assist when connected with the Air-O-Matic power steer booster has been announced. The control valve is mounted on the truck steering column for either right or left hand operation. It is operated by a lever extending from the valve outward, permitting the driver to select the degree of steering assistance desired by moving the lever up or down without taking his eyes off the road or his hands off the steering wheel. It is claimed to eliminate the possibility of oversteering and result in safer vehicle operation.

Installation of the booster is said to be simple. It may be made on either old or new vehicles without altering or removing any part of the steering mechanism. Only one air line is required. Anodized aluminum is the principal material. Since there is no reservoir or pump, maintenance is said to be reduced. *Air-O-Matic Power Steer Corp.*

Circle 27 on page 73 for more data

More Barrel Bearings for Industry

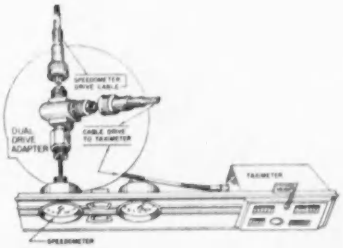


The self-aligning "Barrel Bearing" is available in volume quantities for general industrial applications, for the first time.

These angular contact bearings are designed to sustain radial, thrust, or combination loads and are freely self-aligning. Company officials say that the new bearing has been thoroughly proven in the industry. *Hyatt Bearings Div., General Motors Corp.*

Circle 28 on page 73 for more data

Shaft Adapter for Dual Drive Applications



A "Circle Ess" dual drive adapter is available for use with flexible shaft drives where more than one unit is to be driven from the same power source. It provides two ratios from the same source or facilitates attaching flexible shaft drives where limitations in space prevent direct connection without bending the shaft to the point of possible damage. The adapter is furnished with standard ⅝ in. x 18 threaded connections with 0.104 in. internal square drives and in ratios of 1 to 1, 15 to 1, 16 to 1 and 17 to 1 for either left or right rotation.

The body is aluminum alloy with brass connectors and the hardened steel gears run in Oil-lite bearings. *F. W. Stewart Manufacturing Corp.*

Circle 29 on page 73 for more data

NEW PRODUCTS

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Oil Quantity Gage



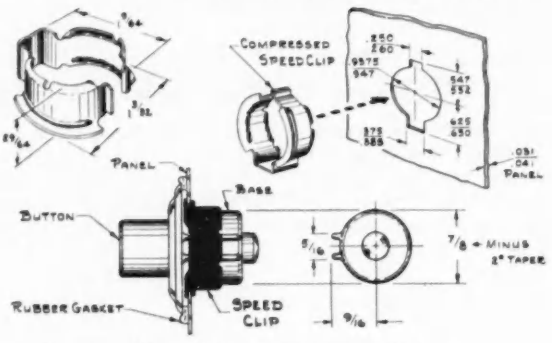
The amount of oil in the crankcase is indicated on this instrument now on the market. Called Oil-Vue, it can be installed easily by any motorist, according to the maker. Oil-Vue is clamped to the steering column below the steering wheel. It is connected by a thin rubber tube through any of the already existing holes below the dashboard to a special dipstick. *Allen Instruments, Inc.*

Circle 38 on page 73 for more data

Handle Retainer

Providing high quality and low materials handling and labor costs, a special tubular Speed Clip has been developed to retain button-type handles to automobile doors. Eliminating the need for screws, nuts and assembly tools, the new one-piece spring steel fastener is assembled by compressing the free ends of the clip slightly inward and pressing it by hand into the notched panel hole where it locks itself securely in place. The push-button handle assembly is then pressed into the Speed Clip where it is locked permanently under live spring tension. An offset saddle section of the device engages a notched opening in the door panel to prevent it from turning, and two ribs in the clip's body hold it rigidly in place. *Tinnerman Products, Inc.*

Tinnerman Speed Clip



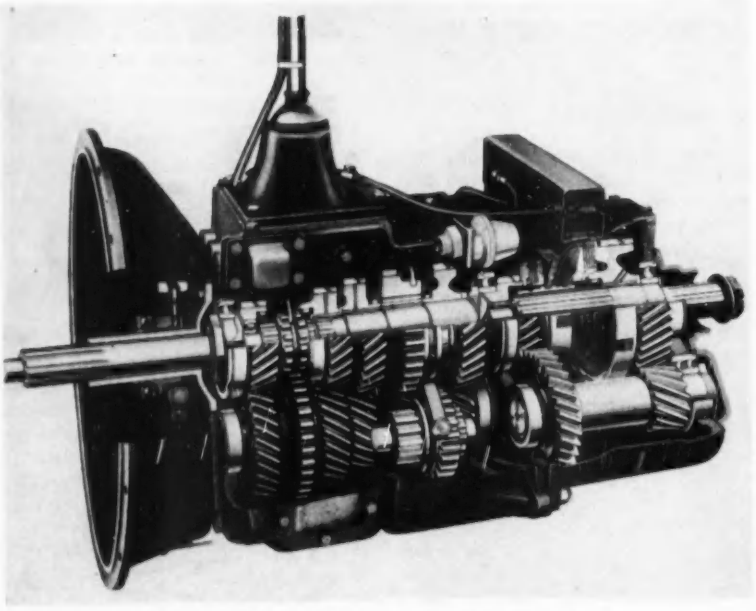
Circle 32 on page 73 for more data

Undercoating

Recently announced is an emulsion undercoating for vehicles that is said to afford protection against fire and explosion.

It is also claimed that the product has no odor, good adhesion properties, and is easily sprayed. *Philip Carey Mfg. Co.*

Circle 31 on page 73 for more data



The R-45 Roadranger eight-speed transmission by Fuller.

Eight-Speed Transmission

Trucks in the 125-160 hp engine class—those delivering up to 385 lb ft of torque—are now able to utilize eight speeds forward with a R-45 transmission.

The eight forward speeds are secured by using a four-speed shifting pattern twice—the first time with the auxiliary section in low gear or low range; second, with the auxiliary section in high gear or high range.

The R-45 Roadranger utilizes a synchronized electric-air power shift between ranges, actuated by a button at the shift lever, by which the operator can pre-select the desired range. The synchronized range shift occurs automatically as the shift lever moves through the neutral position. Every shift is an average 38 per cent step.

The weight of the new transmission unit is 457 lb. Its installation dimension is 29 9/16 in. *Fuller Manufacturing Co.*

Circle 33 on page 73 for more data

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FREE LITERATURE

Turboprop Ducting

Ducting systems for turbine-propelled aircraft are described in a new booklet, with tables showing uses of compressed air on turbine-propelled aircraft; requirements of pneumatic systems; and a check list for specifying ducting. *Solar Aircraft Co.*

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Climatic Testing

A four-page bulletin, S-950-2, illustrates and describes the S-series of research and testing units, having test spaces ranging from four to 36 cu ft and an operating range of +185F to —80F. *Bowser Technical Refrigeration.*

Circle 2 on postcard for free copy

Power Presses

Bulletin Nos. 226 and 225 describe a line of single and double crank straight side presses, respectively, for metal stamping. *Clearing Machine Corp.*

Circle 3 on postcard for free copy

Chain Oilers

A new chain oiling system with a number of brush sizes for oiling several chains, or the sides of chains, is described in bulletins 69-30 and 69-31. *Oil-Rite Corp.*

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Vertical Scale Indicator

Bulletin 1541 illustrates and describes 6⅛-in. wide instrument for the rapid and precise multiple indication of any variable that can be transformed to millivolts. Designed for applications where panel space is at a premium. *Minneapolis-Honeywell Regulator Co.*

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Water Softener

An ionXchange industrial water softener brochure is said to contain all necessary information for the accurate specification of water softener equipment for any type of manufacturing or processing plant. It gives a cut-away drawing of a typical Illco-Way unit, showing the inner workings of the softener, water and brine distribution mechanism, exchange material depth, etc. Supplementary sketches show the direction of water and brine flow during service, brine-rinse and regeneration cycles. *Illinois Water Treatment Co.*

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Flux Recovery

Reclaiming equipment for unfused abrasive welding flux used in submerged arc welding is described in a recent bulletin. *Invincible Vacuum Cleaner Mfg. Co.*

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PAGE MISPRINT

Bakelite Properties

Comprehensive information about the properties, test values, molding techniques and applications of Bakelite phenolic plastics is presented in a new booklet, M-1. It offers about the five types—general purpose, improved impact, heat-resistant, low-loss electrical and special purpose with a property data table which lists the values of each type of phenolic when subjected to 24 mechanical, electrical and miscellaneous tests, ranging from compression strength to water absorption. General steps in the production of a molded product from these materials are set forth, along with 15 useful product design recommendations. *Bakelite Co., div. of Union Carbide and Carbon Corp.*

Circle 12 on postcard for free copy

Exhaust Purifier

Now available is a folder on the OCM catalytic exhaust, a device for removing carbon monoxide, fumes, and odors from all types of gasoline-powered equipment. *Oxy-Catalyst, Inc.*

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Lubricating Screw Machines

An interesting description of single and multiple spindle automatic screw machines, in addition to a complete explanation of lubrication requirements is available in Vol. 39, No. 9 of *Lubrication. The Texas Co.*

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11/10/53

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79	80	81	82	83	84		
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TITLE .....

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KEET) (CITY) (ZONE) (STATE)

HY-PRO HAS SPECIALIZED TAP PRODUCTION

...to cut man-hours from your schedule

Tap production is a specialty at Hy-Pro. Our full set-up, from design engineer to shipping clerk, is concentrated toward one end—perfecting tap output and service. Over the years our proven record in the tap field has won Hy-Pro recognition among production men as "the tap specialist".

Whatever your particular needs may be—from a special tap problem to your regular set-up—it will pay to make use of our engineer specialists. They are always ready to answer your call.

We can be reached directly or through your local Hy-Pro jobber. A complete line of top quality Hy-Pro taps plus our specialist engineers can help cut man-hours from *your* production schedule.



REG. U.S. PAT. OFF.

HY-PRO



HY-PRO TOOL CO., NEW BEDFORD, MASS., U. S. A.

ADDITIONAL WAREHOUSES:

6046 College Ave.
OAKLAND 18, CALIF.
Piedmont 5-4337

10428 W. McNichols Rd.
DETROIT 21, MICH.
University 4-1077

6141 North Elston Ave.
CHICAGO, ILL.
Newcastle 1-6486

Fluid Selector

This slide-rule type cutting and grinding fluid selector helps determine which cutting fluids can be used for various machining operations for steel, stainless steel, magnesium, brass, bronze, copper, aluminum and monel, along with machinability ratings of the various metals. *D. A. Stuart Oil Co., Ltd.*

Circle 8 on postcard for free copy

Superchargers

How a line of superchargers boost the power of Diesel and gasoline engines is the subject of a new descriptive bulletin, No. 153. *Miehle-Dexter Supercharger Div., Dexter Folder Co.*

Circle 9 on postcard for free copy

Air Control Valve

Data Sheet D-813 shows design of air control valves with two speed controls built into the body. *Valvair Corp.*

Circle 10 on postcard for free copy

Smaller Keller Machine

Type BG-21 Keller machine in 5 x 2½ ft and 6 x 4 ft sizes is described in circular 565. *Pratt & Whitney Div. of Niles-Bement-Pond Co.*

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USE THIS POSTCARD

Bakelite Properties

Comprehensive information about the properties, test values, molding techniques and applications of Bakelite phenolic plastics is presented in a new booklet, M-1. It offers about the five types—general purpose, improved impact, heat-resistant, low-loss electrical and special purpose with a property data table which lists the values of each type of phenolic when subjected to 24 mechanical, electrical and miscellaneous tests, ranging from compression strength to water absorption. General steps in the production of a molded product from these materials are set forth, along with 15 useful product design recommendations. *Bakelite Co., div. of Union Carbide and Carbon Corp.*

Circle 12 on postcard for free copy

Diamond Wheel

Recently released is a folder on the Jetaline diamond wheel for carbide grinding. Used with a coolant, it reportedly will plunge cut in a single pass a ⅛ in. slot in a carbide blank one in. long. *Action Diamond Tool Co.*

Circle 13 on postcard for free copy

Materials Handling

Recently released is a 12-page brochure on new methods in bulk and packaged materials handling. *Tractor Div., Allis-Chalmers Manufacturing Co.*

Circle 14 on postcard for free copy

Pressure Tapes

Fifty-eight ideas for cutting costs with "Scotch" brand pressure-sensitive tapes are described in a new 36-page "special report to the aircraft industry." *Minnesota Mining and Manufacturing Co.*

Circle 15 on postcard for free copy

Solenoid Valves

Detailed specifications of Speed King solenoid pilot operated control valves are given in bulletin SK-53. *Valvair Corp.*

Circle 16 on postcard for free copy

Ultrasonic Testing

A new brochure, 50-110, illustrates the latest trends in equipment and techniques available in the field of nondestructive testing. *Sperry Products, Inc.*

Circle 17 on postcard for free copy

Exhaust Purifier

Now available is a folder on the OCM catalytic exhaust, a device for removing carbon monoxide, fumes, and odors from all types of gasoline-powered equipment. *Oxy-Catalyst, Inc.*

Circle 18 on postcard for free copy

Lubricating Screw Machines

An interesting description of single and multiple spindle automatic screw machines, in addition to a complete explanation of lubrication requirements is available in Vol. 39, No. 9 of *Lubrication. The Texas Co.*

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(*See preceding page*)

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
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AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

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11/15/53

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HY-PRO HAS SPECIALIZED TAP PRODUCTION

...to cut man-hours from your schedule

Tap production is a specialty at Hy-Pro. Our full set-up, from design engineer to shipping clerk, is concentrated toward one end—perfecting tap output and service. Over the years our proven record in the tap field has won Hy-Pro recognition among production men as "the tap specialist".

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We can be reached directly or through your local Hy-Pro jobber. A complete line of top quality Hy-Pro taps plus our specialist engineers can help cut man-hours from *your* production schedule.



REG. U.S. PAT. OFF.
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6046 College Ave.
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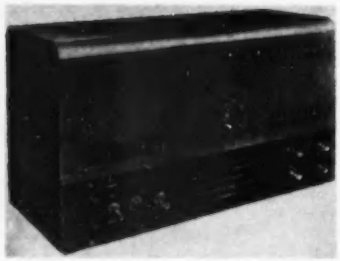
10428 W. McNichols Rd.
DETROIT 21, MICH.
University 4-1077

6141 North Elston Ave.
CHICAGO, ILL.
Newcastle 1-6486

NEW AIRCRAFT PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73

Voltage Regulator

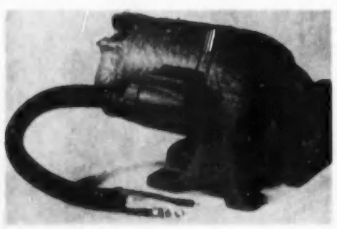


A precision a-c regulator for 400-cycle supplies, model 116-A, features adjustable RMS output voltage, with regulation to 0.01 per cent up to half the rated load (50 va) and to 0.02 per cent up to the full rated load (100 va). This regulation is maintained with allowable input voltage fluctuations of ±10 per cent about the adjusted output level, and frequency fluctuation of ±5 per cent. Recovery time from transients is less than 0.01 second. Developed harmonics are less than one per cent. Measuring only 17 in. x 9⅛ in. x 7 in. in size, this instrument is easily portable and said to be ideally suited to bench mounting. *Avion Instrument Corp.*

Circle 46 on page 73 for more data

Continuous Duty Motor

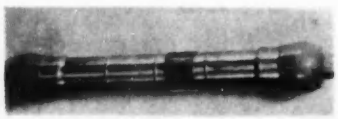
An open, self-ventilated ½ hp aircraft motor with integral gearing, type GA, is rated for continuous duty up to 35,000 ft altitude. Output speeds are available from 1500 to 5000 rpm. Designed to operate on three-phase, 400 cycle alternating current, the GA design will meet USAF specification 32590.



Thermal overload protection is one of the features of this unit. Others include: integral cooling fan, hardened and shaved helical gears, internal spline take-off shaft, AN mounting pad, rapid acceleration and high torque. *U. S. Electrical Motors, Inc., Aircraft Div.*

Circle 47 on page 73 for more data

Accumulator



A line of hydraulic accumulators are of the cylindrical type—both single and double shell construction—and are recommended for any aircraft installations involving pressures up to 3000 psi. Design conforms to Military Specification drawing MS 28700; the units meet all requirements of MIL-A-5498, including gunfire and low-temperature pre-charge leakage test.

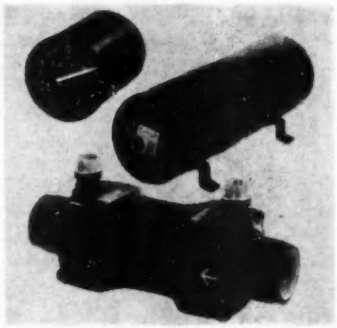
Presently, the firm is making the accumulators in sizes ranging from 12½-in. overall, 2¼-in. cylinder and 8 13/16-in. stroke to 33⅜-in. overall, 4½-in. cylinder and 27⅞-in. stroke. Respective weights are 3.8 lb. and 29.5 lb. Nominal total accumulator oil volumes range from 25 through 400 cu in. (isothermal). Features include: Pressure-balanced inner cylinder; free-floating piston; warning vents; and forged end caps with internal threads. *Parker Aircraft Co.*

Circle 48 on page 73 for more data

Jet Flowmeter

A mass flowmeter system accurately measures the true mass rate of fuel consumption per engine, thereby eliminating fuel density errors due to type and temperature of the fuel.

The apparatus consists of a constant-frequency power supply (center), a transmitter (below), and an expanded-scale indicator, located on the pilot's instrument panel, which reads directly in lb per hr. For multi-engine aircraft, a single power supply is capable of operating up to eight transmitters and indicators. Total weight of the system is approximately 11 lb.



Conductive and radiative radio noise is kept within the limits established by military specifications, MIL-1-6181. In addition, all critical components are internally shock-mounted to withstand severe vibration. Wiring weight in multi-engine planes is held to a minimum by using common leads as much as possible, and by mounting the transmitters in the low-pressure fuel lines which are closer to the indicators than the usual engine installation. This low-pressure off-engine installation is made possible by the extremely low pressure drop in the transmitter.

The transmitter operates up to 12,000 lb per hr of mass flow, and will withstand up to 200 psi pressure. It will operate with fuel of any temperature from −55C to +70C. All of the system's circuits are hermetically sealed.

The transmitter is approximately 10½ in. long and 3¾ in. in diameter, the indicator is about 2 in. in diameter and 2½ in. long, and the power supply is 4⅛ in. in diameter and 11⅛ in. long. *General Electric Co.*

Circle 49 on page 73 for more data

Need a high capacity bearing that's compact?

here's how leading chain saw manufacturers get it with NEEDLE BEARINGS

Leading manufacturers of chain saws rely on Torrington Needle Bearings because of their high capacity and their small size.

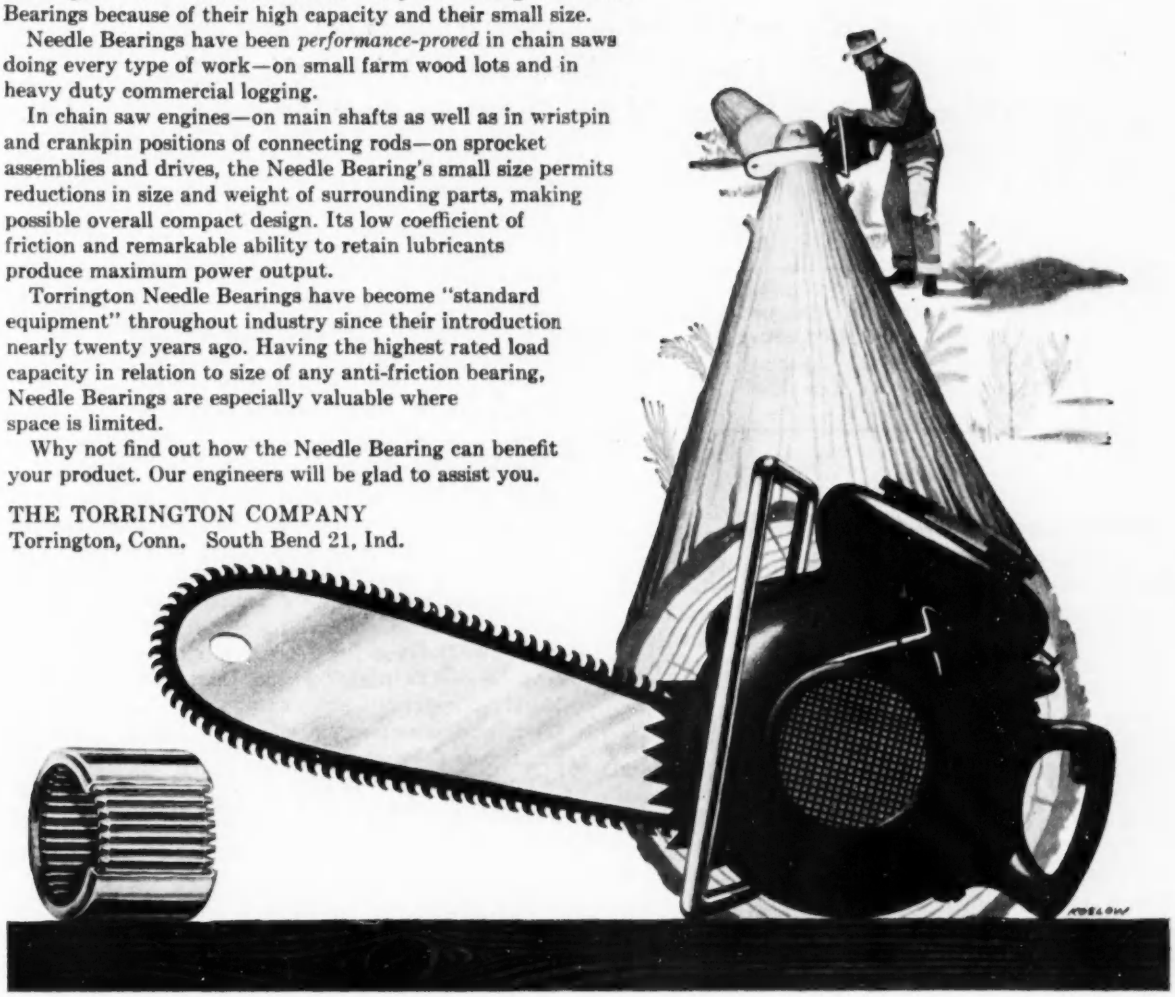
Needle Bearings have been *performance-proved* in chain saws doing every type of work—on small farm wood lots and in heavy duty commercial logging.

In chain saw engines—on main shafts as well as in wristpin and crankpin positions of connecting rods—on sprocket assemblies and drives, the Needle Bearing's small size permits reductions in size and weight of surrounding parts, making possible overall compact design. Its low coefficient of friction and remarkable ability to retain lubricants produce maximum power output.

Torrington Needle Bearings have become "standard equipment" throughout industry since their introduction nearly twenty years ago. Having the highest rated load capacity in relation to size of any anti-friction bearing, Needle Bearings are especially valuable where space is limited.

Why not find out how the Needle Bearing can benefit your product. Our engineers will be glad to assist you.

THE TORRINGTON COMPANY
Torrington, Conn. South Bend 21, Ind.



TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Trade-marks of leading chain saw manufacturers whose products enjoy the benefits of the Needle Bearing.

HOMELITE CORPORATION · Mall · LG · CLINTON · McCULLOCH McC CHAIN SAWS · POULAN · TITAN CHAIN SAWS · DISSTON · REED PRENTICE CORP

The BUSINESS PULSE

Business Readjustments Limited to Certain Industries and Have Been Orderly. Overtime Hours Reduced by Producers of Nondurable Goods. Demand for Steel Has Improved. New Construction Expenditures Lower.

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

Lower Levels of Activity

Incoming data signify that although aggregate volume of business is still very large, rather well-defined readjustment tendencies are appearing in them. Looking backward, it seems fairly clear now that adjustments actually began to take place some months ago, but at that time it was difficult to judge to what extent movements were influenced by seasonal factors. Recently, however, the failure of business to show its normal autumn expansion has pretty well confirmed the fact that the economy is moving toward lower levels of activity.

Not all industries have been equally affected by the declining tendency. Thus far, losses have been most pronounced in durable-goods industries, with steel, automobiles, farm machinery and appliances leading the way. With the notable exception of petroleum, nondurable goods industries have shown comparative strength, particularly at the production level.

To date, the decline in over-all activity has been limited, as far as actual magnitude is concerned, and adjustments in particular industries have been orderly. Nothing which has happened up to this point seems to challenge the widely held view that no real recession is in prospect.

The behavior of the business index compiled by the Guaranty Trust Co. points up the general pattern now evident in total activity. The index reached a high point for the year in June and then dropped off in the midsummer period by roughly 1¼ per cent. A further decline of approximately the same magnitude occurred from August to September, carrying the index to its lowest level since January. But even at the September rate, business activity remained exceedingly good by "normal" standards, available evidence indicating that total employment, income and output were close to their record highs.

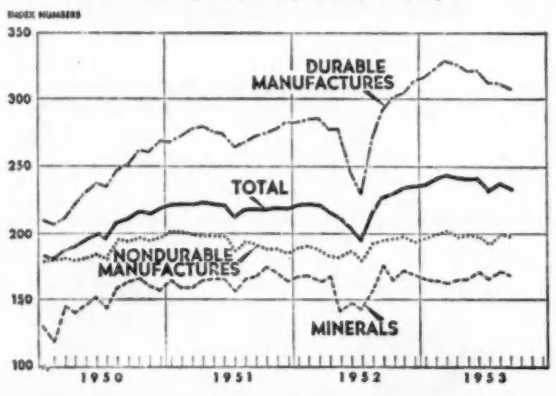
Decline in Durable Goods

The more favorable performance of nondurable as compared with durable-goods industries shows up in the Federal Reserve Board's seasonally adjusted index of industrial production. The durables component of that index has been declining almost without interruption since the end of the first quarter of the year and by September was some 6.4 per cent below its March peak. Output of nondurables, by contrast, has been much steadier and for September stood only two per cent below the peak for the year, also reached in March. Nondurable-goods output recovered somewhat after the midsummer dip, whereas durables output did not, but on the contrary continued to decline.

Developments in factory employment over the past five or six months also point up these divergent tenden-

(*Turn to page* 134, *please*)

INDUSTRIAL PRODUCTION
(Seasonally Adjusted, 1935-39=100)



CHROME

reaches its greatest effectiveness in

Sealed Power KromeX

FULL-FLOW RING SETS



1 Top compression ring of chrome-alloy cast iron has solid chrome face, factory-lapped to a light-tight finish, with sides Granosealed for greater flexibility.

2 MD-50 Steel Oil Ring with the Full-Flow Spring has chrome-faced side rails for double mileage, with sides Granosealed for greater flexibility.

3 All rings in Sealed Power KromeX Ring Sets are beveled or tapered to threadline contact for quicker seating and blow-by control.

25 leading engine builders now use Sealed Power chrome rings!

Sealed Power Piston Rings

SEALED POWER CORPORATION • MUSKEGON, MICHIGAN

Sole manufacturers of KromeX Ring Sets, MD-50 Steel Oil Ring, Full-Flow Spring, Flex-S Flexible Oil Ring, and GI-60 Groove Inserts.
Leading Producer of Automatic Transmission Rings, Power Steering Rings and Non-Spin Oil Rings.

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Continued from Page 23

Alkyd Plastic Finds Wide Automotive Use

One of the relatively new industrial plastics—mineral filled alkyd—is now doing numerous heavy-duty electrical jobs for major automobile and automotive component manufacturers.

The thermosetting material, a product of Plaskon Div. of Libbey-Owens-Ford Glass Co., was introduced to industry about four years ago. It is already being used in quantity by several car manufacturers and by a good many smaller concerns.

Chrysler is using mineral-filled alkyd for coil tops in its 12-v systems and alkyd spark plug connectors on V-8 engines. Electric Auto-Lite is using the plastic in coil top and connector molding, while Ford is employing terminal blocks of alkyd in instrument panel dimmer switches. Another automobile maker is currently using alkyd for automatic window switch receptacles and master switches.

Among suppliers of electrical components, Holley Carburetor Co. is using alkyd for distributor caps and rotors. Both Mallory Electric Co. and P&D Manufacturing Co. are using the plastic for alkyd coil tops.

Alkyd distributor cap rotors and distributor base plates are being used by Harman-Collins, Inc., for its heavy-duty dual coil ignition units. Alkyd is also being used to house tachometers made by Stewart Warner Automotive Div. for use on trucks and buses.

Federal-Mogul Offers To Buy Bearings Co.

Federal-Mogul Corp., Detroit, will acquire the name, assets, and business of the Bearings Co. of America, Lancaster, Pa., if stockholders approve. Directors of both companies have approved the proposal, which will be submitted to their shareholders at special meetings Dec. 8.

If approved, Bearings Co. will receive 72,300 shares of Federal-Mogul stock as the purchase price. The deal would give Federal-Mogul a line of ball bearings, something which the company long has sought to complete its line of engine bearings, bushings, and tapered and straight roller bearings. Present plans call for operating the Bearings Company as a Federal-Mogul division.

Doman Helicopters Forms Canadian Subsidiary

Doman Helicopters, Inc., has announced that it is forming a Canadian subsidiary named Doman-Fleet Helicopter, Ltd.

Originally, this subsidiary was to build Doman helicopters for the Canadian military and commercial markets. However, negotiations have determined the desirability of a broader program which will secure for Doman's over-all export production program the advantages of an excellent existing Canadian plant.

As a result of this advantage, production of Doman LZ-5 helicopters for other existing commercial customers will be carried on in Canada by the new subsidiary. Management, engineering and export services will continue to be handled by Doman from New York.

Doman-Fleet Helicopters, Ltd., will utilize the 263,000 sq ft plant and personnel of Fleet Manufacturing, Ltd., which has reportedly produced more than 5000 planes and is currently producing F-86 components. These facilities, it is stated, will enable Doman to make immediate volume deliveries of its commercial helicopters.

Sealed Power Sells Moog Part of Line

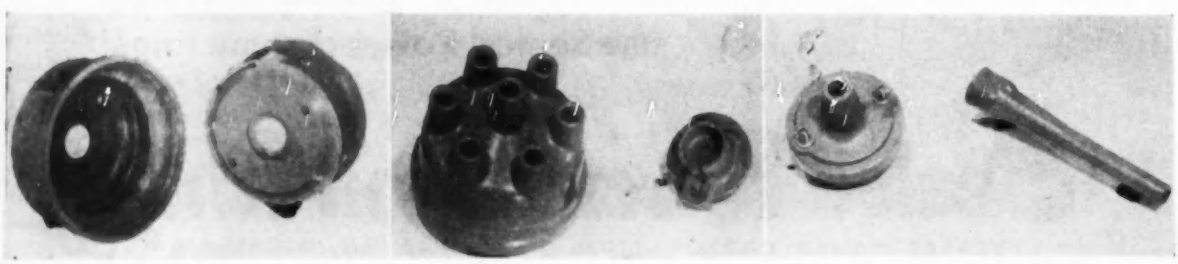
Moog Industries, Inc., has acquired the front end and chassis parts business of Sealed Power Corp. Sealed Power will now concentrate its activities on its line of piston rings, pistons, cylinder sleeves, valves, and water pumps.

Moog will take over the Muskegon firm's inventory of king bolts, tie rod ends, coil action parts, and shackles Jan. 1 and will service distributors who have been handling these products for Sealed Power. Financial details of the transaction were not disclosed.

Rubber Use Soars

World rubber consumption this year is expected to hit a record-breaking high of 2.4 million tons. This optimistic forecast was recently made by E. J. Thomas, president of Goodyear Tire & Rubber Co.

(*Turn to page* 154, *please*)



Typical of the wide range of automotive components in which alkyd plastic is being used are: tachometer housings (left); distributor cap and rotor (center); and spark plug insulator and coil top (right).



New Hydraulic Fluid Won't Burn or Explode!

Houghton

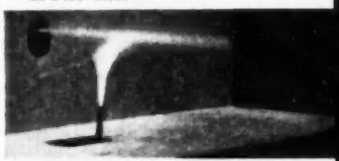
HOUGHTO-SAFE

IS SAFE 7 WAYS!

5 years in the Lab —now proved in the field!



CONVENTIONAL OIL BURNS INSTANTLY... An atomized jet of regular hydraulic oil pressure-sprayed into flame from a blow torch ignited immediately into an 8-foot blaze!



HOUGHTO-SAFE WOULDN'T IGNITE! This non-flammable fluid, similarly sprayed under pressure into the same flame, would not ignite—no flash, no flame!



Ask the Houghton Man for our new bulletin, containing research data, case histories and pictured proof of Houghto-Safe's efficiency. Or write to E. F. Houghton & Co., Philadelphia 33, Pa., for answers to any questions you may have about this new safe hydraulic fluid.

Perfected after more than five years of research and field testing, Houghto-Safe offers protection to both men and machines. This new hydraulic fluid . . . rated "acceptable from the fire hazard standpoint" by Factory Mutual . . . now proves that fire-resistant qualities *can be obtained without loss in operating efficiency!* In plants performing die casting, welding, hot press forging and other hydraulic operations — especially near open flames or extreme heat — Houghto-Safe is the long-awaited answer. Here are 7 good reasons why it's really safe . . .

1. **It's Non-Flammable**—This newly-developed hydraulic fluid won't burn or flash—even when sprayed into an open flame.
2. **Prevents Corrosion**—The new formula contains inhibitors developed by Houghton to prevent corrosion and rust in any hydraulic system.
3. **It is Non-Toxic**—Safe for workers to handle—and it bears no unpleasant odor.
4. **Fortified Lubricity Saves Equipment**—Reinforced for high film strength by a chemical additive that gives metal parts greater protection for longer periods.
5. **Oxidation Stability Adds Extra Life**—Its exceptional resistance to oxidation assures longer service life—proved by over 5500 hours of testing in equipment in actual use.
6. **High Viscosity Index Reduces Wear**—New Houghto-Safe has a viscosity index of 150, showing its stability through widely fluctuating temperatures, and providing safe operation at all normal temperatures. It won't freeze—pumps easily at zero without preheating.
7. **Safe for Packings**—Has no ill effect on synthetic rubber packings—neither attacks them nor impairs their high efficiency throughout their effective life.

HOUGHTO-SAFE . . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO



Ready to give you on-the-job service . . .

AIR BRIEFS

By ROBERT McLARREN

Air Force Size Set

Secretary of Defense Charles E. Wilson has announced that the "new look" by the Joint Chiefs of Staff has resulted in a recommendation for an Air Force of 127 wings and that this strength level will be used in preparation of the 1955 fiscal year budget, now under way. It will be recalled that the Air Force had been building towards a 143-wing level since September, 1951, and that one of Wilson's first acts was to cut this program to a 120-wing size. Wilson says that the 127-wing force can be supported by the present 960,000-man ceiling on Air Force personnel.

Production Peak

Meanwhile, industry and Government officials reveal that the aircraft manufacturing industry has reached its peak, according to present plans. Employment in the nation's airframe, engine and propeller plants is now about 750,000 and no major increase is planned. These people work for 30 airframe, 20 engine and 10 propeller manufacturers. Not included in the total are some 60,000 subcontractors and suppliers, whose aviation products account for as much as 100 per cent and as little as one per cent of their total output. Production this year is estimated by Aircraft Industries Association at about 12,000 military aircraft and 4700 civil aircraft, the biggest year in output since World War II.

High Performance Goal

Air power observers are becoming increasingly impressed with Wilson & Co.'s strong accent on the introduction of new and improved combat aircraft on the assembly line. The "build up" program of the previous administration was based largely on expanding the volume production of existing types, which, of course, may well have been the only practicable approach. Secretary of Air Force Talbott and USAF Chief of Staff Twining have ordered the North American F-100 and the Boeing B-52 into quantity production, easily the world's best airplanes in their respective categories. Deliveries are also now being made on such new aircraft as the Martin B-57 Night Intruder, the Douglas RB-66 medium bomber and the Republic F-84F swept-wing ground support fighter. These forward-looking procurement moves are lending credence to Wilson's argument that the "new" Air Force, although of smaller size than previously planned, will actually be a more effective and powerful Air Force.

First Labor Troubles

The new Administration is facing its first labor difficulties since it took office last January and millions in both parties are watching closely to note philosophies. First difficulties are already at hand in the aircraft industry where, as this is being written, 33,453 workers of North American Aviation are out on strike. UAW(CIO) was asking a 26¢-an-hour wage boost, while the company was offering only 8-9¢. Meanwhile, IAM was calling a strike vote at Lockheed and opening negotiations with Douglas and Convair, all in the Southern California area. Union intention was to raise aircraft wages to the level of auto workers. Aircraft industry rebuttal was terrific increase in aircraft costs and the Administrations's determined policy to cut costs in that field.

Stolen March

Promotional enterprise is still very much alive in the airline industry and TWA has just stolen a significant march on American Airlines. American had been widely advertising its scheduled introduction of nonstop transcontinental air service on Nov. 29 using its new Douglas DC-7 transports, which will make the New York-Los Angeles trip in less than eight hours. TWA quietly but quickly announced a nonstop schedule between Los Angeles and New York using its new Lockheed Super Constellation transports and made its first flight Oct. 20 with a full load of passengers. But TWA's victory was not complete. Due to Air Line Pilots Association restrictions, airline pilots cannot fly more than eigh hours at the controls. The Super Constellation makes the eastbound flight within the eight-hour time limit but the prevailing westerly winds force the westbound flight to stop at Chicago for a crew change. American's faster DC-7 makes the trip under eight hours in both directions and the American service offers a daily trip in each direction. As a warm-up for the new service, an American DC-7 made a

(*Turn to page* 142, *please*)

Automatic ENGINE CONTROLS



CRANKING CONTROLS



ALARM RELAYS

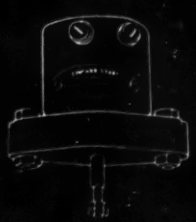
You can get a SYNCHRO-START Control to meet any Engine Control requirement, for Gas, Gasoline or Diesel engines, no matter what the power application may be, either for FULL AUTOMATIC, SEMI-AUTOMATIC, MANUAL, PROTECTION ONLY, or a COMBINATION of any or all of the control features to meet exactly what you want, or that is needed to fulfill a specific demand.

Nineteen years of manufacturing engine controls, ranging from a simple switch to multiple-engine control panels, have given SYNCHRO-START the "know-how" to make thoroughly DEPENDABLE CONTROLS to meet your needs correctly.

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More Defense Contract Awards

THIS latest list of defense prime contracts that have been awarded covers the period from September 28, 1953, to October 23, 1953. Items included in this list are for various types of automotive military equipment, including tanks, motorized gun carriages, trucks, arplanes, automotive components and spare parts, automotive maintenance equipment, etc.

—A—

Air Associates, Inc., Teterboro, N. J.
Actuator—Various—$957,954

American Bosch Corp., Springfield, Mass.
Parts—Various—$35,813

American Locomotive Co., Seattle, Washington
Locomotive parts—lot—$13,150

Automotive Gear Co., Detroit, Michigan
Vehicle parts—4800—$26,784

—B—

Bacharach Industrial Co., Pittsburgh, Pa.
Pressure hydraulic indicators—48 ea—$38,889

Beech Aircraft Corp., Wichita, Kansas
Assys for aircraft—$318,815

Bendix Aviation Corp., Bendix Products Div., S. Bend, Indiana
Parts—Various—$464,760
Strut assys—Various—$930,449

Bendix Aviation Corp., Eclipse Pioneer Div., Teterboro, N. J.
Gyro horizon indicators—2—$66,176
Pressure transmitters—5339—$708,690
Pressure indicators—3099
Tools—Various—$86,626

Bendix Aviation Corp., Scintilla Magneto Div., Sidney, N. Y.
Distributor for various engines—278 ea—$69,125
Maintenance parts—Various—$358,808

Benson Mfg. Co., Kansas City, Missouri
Rotor assy.—66 ea—$53,360

Bergen Engineering & Development Corp., Paramus, New Jersey
Development of hydraulic epicyclical—Job—$43,634
(Expanded) rubber
Wheel drive fork
Truck

Boeing Airplane Co., Seattle, Washington
Ejection seat development—$1,000,000
Blower, projector sets—64 ea—$28,423
Motor—50 ea
Speaker—156 ea

Boyertown Auto Body Works, Inc., Boyertown, Pa.
Trailers, medical surgical—8—$83,671

The Bristol Company, Aircraft Equipment Div., Waterbury, Conn.
Control for various aircraft—54 ea—$26,309

—C—

Campbell Chain Co., York, Pa.
Brake lining, clutch facings, oil filters, etc.—Contract indefinite
11/1/53
10/31/54

Canadian Commercial Corp., Ottawa, Canada
Gilding metal—1,400,000 lb—$826,420

Cessna Aircraft Co., Wichita, Kansas
Training parts—1 lot—$50,000

Chrysler Corporation, Detroit, Michigan
Engineering projects—None—$1,412,583
Trucks, ¼ ton—338 ea—$1,437,549

Cleveland Aero Products, Inc., Cleveland, Ohio
Main strut assy—Various—$53,017

(*Turn to page 88, please*)





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Buda engines power the world's largest dump truck... a twin-engine giant that can haul 60 tons of copper ore per load.

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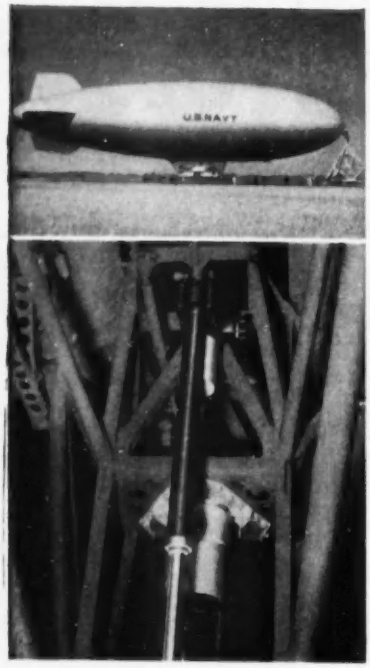
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CALENDAR

OF COMING SHOWS AND MEETINGS

Association of American Battery Manufacturers, Fall Meeting, Edgewater Beach Hotel, Chicago, Ill. .....Nov. 16-18

Fourth Pan American Road Race, Mexico .....Nov. 19-23

American Society of Mechanical Engineers, annual meeting, Statler Hotel, New York, N. Y. Nov. 29-Dec. 4

American Society of Agricultural Engineers, winter meeting, Edgewater Beach Hotel, Chicago, Ill. .....Dec. 7-9

1954

SAE Annual Meeting, Sheraton-Cadillac Hotel and Hotel Statler, Detroit, Mich. .....Jan. 11-15

National Motor Boat Show, Bronx, N. Y. .....Jan. 15-23

Plant Maintenance & Engineering Show, Chicago, Ill. .....Jan. 25-28

Society of Plastic Engineers, 10th annual technical conference, Royal York Hotel, Toronto, Ont. .....Jan. 27-29

Chicago National Boat Show, Chicago, Ill. .....Feb. 5-14

International Motor Sports Show, New York, N. Y. .....Feb. 6-14

National Transport Vehicle Show and Fleet Maintenance Exposition, New York, N. Y. .....Feb. 17-19

World Motor Sports Show, New York, N. Y. .....Feb. 20-28

American Society for Testing Materials, spring meeting, Shoreham Hotel, Wash., D. C. .....March 1-5

SAE National Passenger Car, Body, and Materials Meeting, Hotel Statler, Detroit, Mich. .....March 2-4

Pacific Automotive Show, Seattle, Wash. .....March 4-7

Geneva Automobile & Truck Show, Geneva, Switzerland .....Mar. 11-21

SAE National Aeronautic Meeting, Statler Hotel, New York, N. Y. .....April 12-15

International Motor Show, Turin, Italy .....April 21-May 2

ASTE Industrial Exposition, Philadelphia, Pa. .....April 26-30

American Welding Society, spring technical meeting, Hotel Statler, Buffalo, N. Y. .....May 4-7

International Aviation Trade Show, New York, N. Y. .....May 5-7

Annual Foundry Congress and Show, Cleveland, Ohio .....May 8-14

Canadian International Trade Fair, Toronto, Canada .....May 31-June 11

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Insulated Thermocouple Wire Extension Lead Wire

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Stainless Steel Armored Braid
Silicone Treated
Cotton Braid
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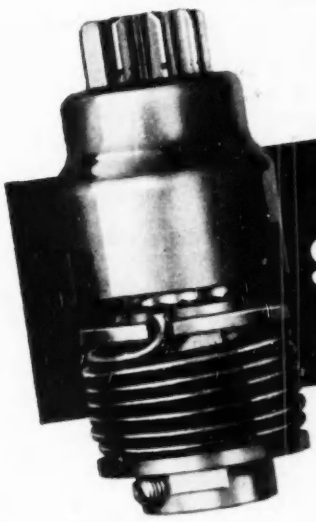
The Folo-Thru type is specially designed to follow thru the weak explosions until the engine actually runs on its own power. Thus, quicker and more dependable starts are assured even under the most extreme weather conditions.

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Bendix* Folo-Thru Starter Drive  **Bendix* Automotive Electric Fuel Pump**  **Stromberg* Aeroquad Carburetor** 

(*Continued from page 84*)

Continental Aviation & Engineering Corp., Detroit, Mich.
Engine modification—49—$97,027

Continental Motors Corp., Muskegon, Michigan
Vehicle parts—8500—$730,660

Curtiss-Wright Corp., Wright Aeronautical Div., Wood-Ridge, N. J.
Engine parts—$2,141,790

—D—

Douglas Aircraft Co., Inc., El Segundo, Calif.
Strut assembly—Various—$167,943
Parts—Various—$85,043

Douglas Aircraft Co., Inc., Santa Monica, Calif.
Maintenance parts—Various—$119,609

—E—

The Emerson Electric Mfg. Co., St. Louis, Missouri
Parts—Various—$84,696

Engineering & Research Corp., Riverdale, Maryland
Motor amplifier assy—Various—$130,454

—F—

Fairbanks Morse & Co., New York, N. Y.
Repair parts for Diesel engines—11,765—$1,073,061

Fargo Motor Corp., Washington, D. C.
Trucks, light—34 ea—$74,876

Ford Motor Company, Dearborn, Mich.
Parts—840—$125,000

Ford Motor Company, Ford Div., Washington, D. C.
Passenger-carrying vehicles—126 ea—$170,712
Trucks, light—432 ea—$511,384

—G—

Gabriel Company, Cleveland, Ohio
Shock absorbers—1564—$41,446

GMC, Allison Div., Indianapolis, Indiana
Modify transmissions—18—$296,262
Transmissions—25—$614,895
Cross-drive transmission—3—$129,039

General Motors Corp., Chevrolet Motor Div., Detroit, Michigan
Passenger-carrying vehicles—52 ea—$70,695

General Motors Corp., Cleveland Diesel Engine Div., Cleveland, O.
Repair parts for Diesel engines—5284—$51,958

General Motors Corp., Delco Products Div., Dayton, Ohio
Motor—342 ea—$33,301

GMC, Detroit Diesel Engine Div., Detroit, Michigan
Generator sets—3 set—$52,432

General Motors Corp., Electro-Motive Div., LaGrange, Illinois
Diesel locomotives—6 ea—$1,021,703

GMC, Foreign Distributors, New York, N. Y.
Trucks, light—6 ea—$10,051

General Motors Corp., New Departure Div., Bristol, Conn.
Anti-friction bearing — 18,000 ea — $30,240

General Motors Corp., Rochester Products Div., Rochester, N. Y.
Regulator assy—90 ea—$28,242

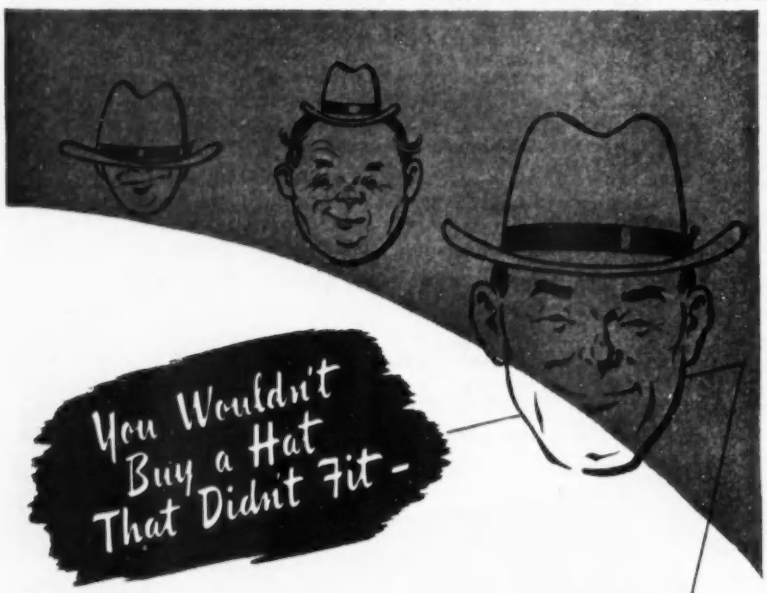
GMC, Truck & Coach Div., Pontiac, Michigan
Preservation fire damaged facilities—$100,000

Gerity-Michigan Corporation, Adrian, Michigan
Chrome plating—729—$56,367

The Goodyear Tire & Rubber Co., Akron, Ohio
Wheel and brake assy—Various—$27,373
Disc—32,925 ea—$657,374
Brake parts—Various—$680,542

Gould-National Batteries, Inc., Depew, New York
Aeronautical storage battery—Various—$62,738

(*Turn to page 90, please*)



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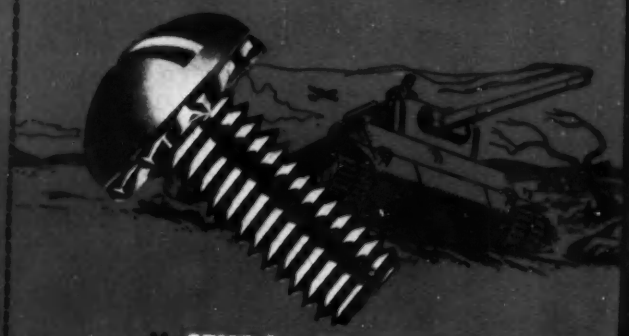
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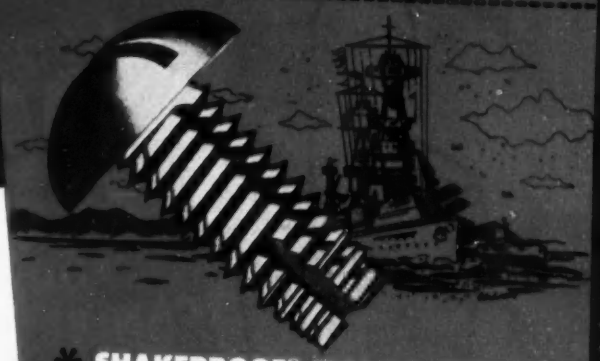
In Canada: Canada Illinois Tools Limited, Toronto, Ontario

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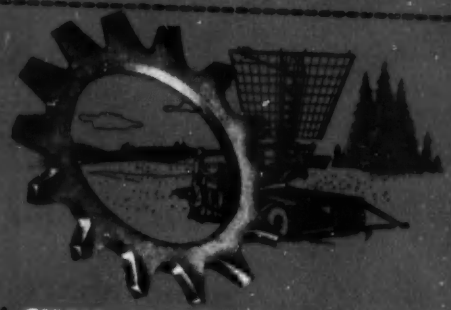
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. . . pre-assembled screws and SHAKEPROOF Lock Washers eliminate separate washer handling, save assembly time.



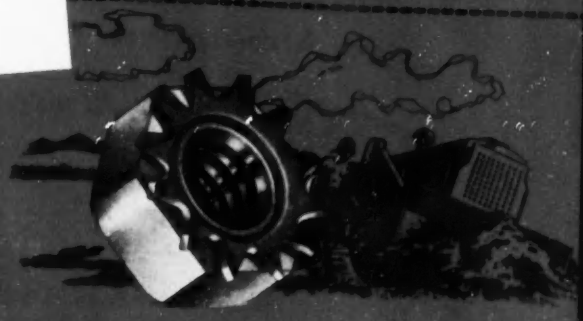
*** SHAKEPROOF® THREAD-CUTTING SCREWS**

. . . cut their own threads in metal or plastic, positively eliminate costly tapping operations.



*** SHAKEPROOF® LOCK WASHERS**

. . . hold vital connections tight, reduce equipment failures due to loose fastenings.



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. . . speed assembly operations because nut and lock washer are pre-assembled . . . every nut is locked against vibration loosening.

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(*Continued from page* 88)

Grèmco, Inc., Fort Worth, Texas
4-wheel electronic maint. vans with diesel driven generator trailers—2—$63,540

—H—

Harnischfeger Corp., Milwaukee, Wisconsin
Cranes—4—$46,101
Hughes Aircraft Co., Div. Hughes Tool Co., Culver City, Calif.
Valve assy—177 ea—$26,984

—J—

Jack & Heintz, Inc., Cleveland, Ohio
Electric starters—1048—$331,745
Generator—368 ea—$331,857
Spares—281 ea
Airplanes—2 ea—$3,019,132

—L—

Lear, Inc., Grand Rapids, Michigan
Material—Various—$198,535
Automatic pilot—33 ea—$220,750
Rotary actuator—61 ea—$40,171
Lear, Inc., Learcal Div., Los Angeles, Calif.
Radio compasses—141—$147,328
Le Roi Co., Milwaukee, Wisconsin
Spare parts—Various—$26,022
Lift Truck Rental Corp., New York, N. Y.
Fork lift trucks—8-24-53 T/C thru
Lockheed Aircraft Corp., Burbank, Calif.
Maintenance parts—Various—$146,273
Lord Mfg. Co., Erie, Pa.
Assemblies for various aircraft—1021 ea—$80,218

—M—

Mid-America Research Corp., Wheatland, Pa.
Modification of trucks design and construction of trailer—$102,000
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Indicators for various aircraft—514 ea—$100,362
Quantity gage fuel indicator—274 ea—$56,948
Motor Wheel Corp., Lansing, Michigan
Facilities—$1,236,290
Van Norman Company, Springfield, Mass.
Milling machine—14 ea—$146,958

—N—

North American Aviation, Inc., Columbus Div., Columbus, Ohio
Maintenance parts—Various—$63,750

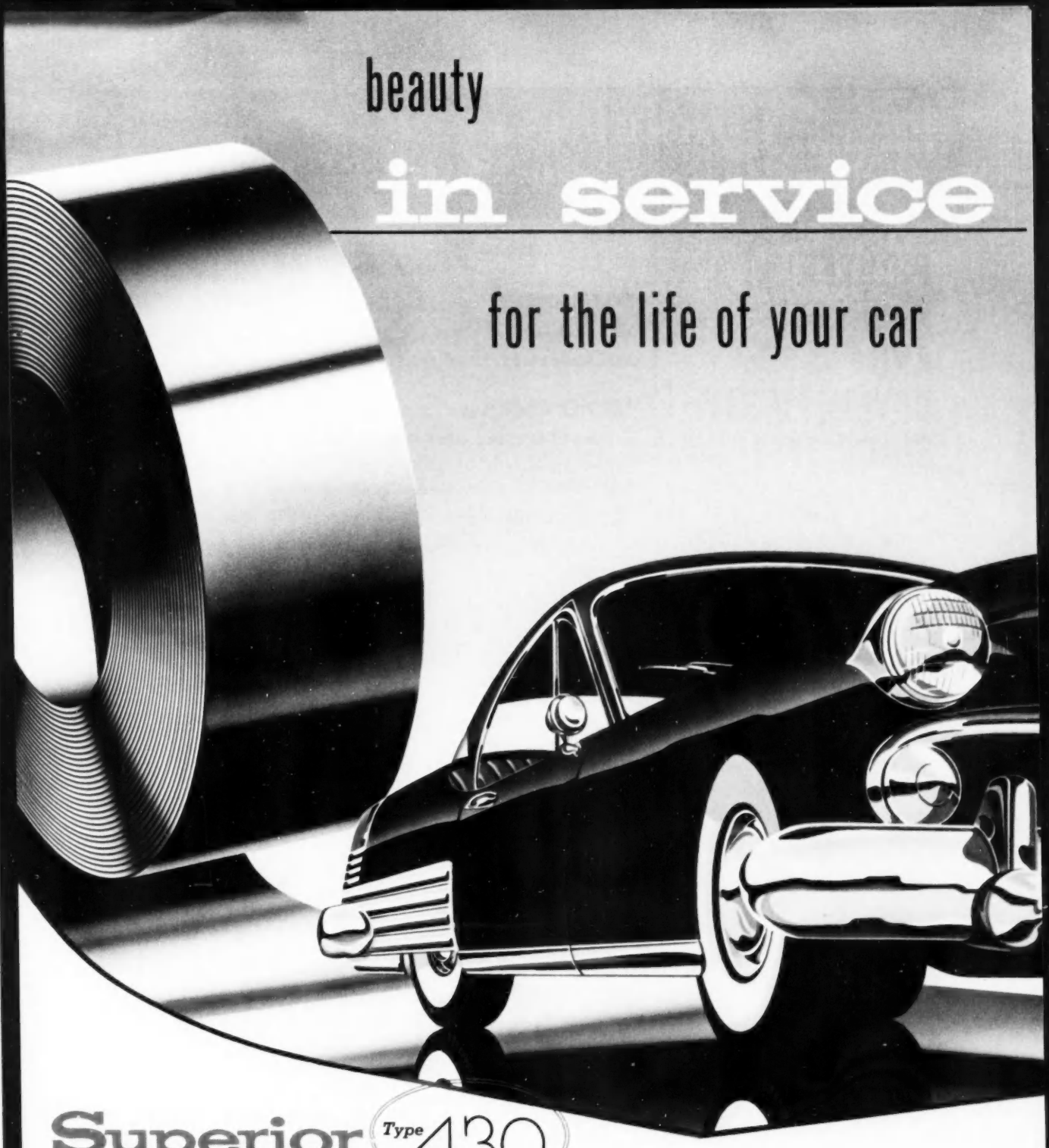
—P—

Packard Motor Car Company, Detroit, Michigan
Packard—1 ea—$206,012
Diesel
Engine in tank

(*Turn to page* 93, *please*)

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ACP metal protective chemicals include: protective coating chemicals for steel, zinc and aluminum; metal cleaners and rust removers; final rinse controls; pickling acid inhibitors; copper coating chemicals; soldering fluxes; alkali cleaners and addition agents; copper stripping and brightening solutions.

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"GRANODINE"® zinc phosphate coatings improve paint adhesion on automobiles, refrigerators, projectiles, rockets, and many other steel and iron fabricated units or components.

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(*Continued from page 90*)

Parker Aircraft Co., Los Angeles, Calif.
Valve assy—Various—$327,060
Piasecki Helicopter Corp., Morton, Pa.
Machine tools—$119,097
Overhaul services—Various—$148,800

—T—

Temco Aircraft Corp., Dallas, Texas
Services & matl.—40—$832,437
The Thew Shovel Co., Elyria, Ohio
Spare parts—Various—$25,410
Thompson Products, Cleveland, Ohio
Pumps—130 ea—$116,681
Pumps—Various—$140,351
Pumps—1037 ea—$253,852

—U—

United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn.
Parts—Various—$174,541
Material—Various—$49,820
Material—114 ea—$70,680
Spare parts—Various—$298,387
Spare parts—Various—$124,433
Spare parts—Various—$335,303
Material—Various—$46,271
Propeller assembly—179 ea—$179,860
Material—220 ea—$119,020
Parts—Various—$120,221
Parts—Various—$194,880
Spare parts—Various—$655,820
Spare parts—Various—$61,608
Material—Various—$530,845
United Aircraft Corp., Pratt & Whitney Aircraft Div., E. Hartford, Conn.
Liner—4233 ea—$50,627
Spare parts—Various—$83,484
Spare parts—Various—$393,168
Material—Various—$249,389
Valve assys—Various—$109,164
Spare parts—Various—$57,298
Support—Various—$514,200
Material—Various—$91,717
Material—3177 ea—$27,195
Crankcase—Various—$640,409
Material—Various—$76,747
Spare parts—Various—$138,573
Spare parts—Various—$38,186
Material—Various—$28,155
Material—Various—$244,740
Spare parts—Various—$206,493
Spare parts—Various—$306,794
Crankcase—Various—$152,042
Crankcase—Various—$128,532
Material—Various—$414,941
Spare parts—Various—$32,441
Material—Various—$113,530
Spare parts—Various—$63,140
Material—Various—$374,971
Material—Various—$286,087
Material—Various—$1,762,494
Spare parts—Various—$119,611
Masterod—Various—$28,875
Spare parts—Various—$100,524
Spare parts—Various—$391,160
Case stud assy—Various—$499,820
Spare parts—Various—$71,288

(*Turn to page 94, please*)

this ARK-LES *idea*

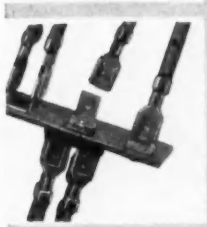
is saving millions in the electrical appliance and automotive industries.

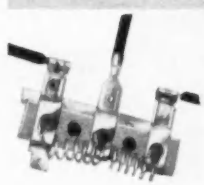
the idea

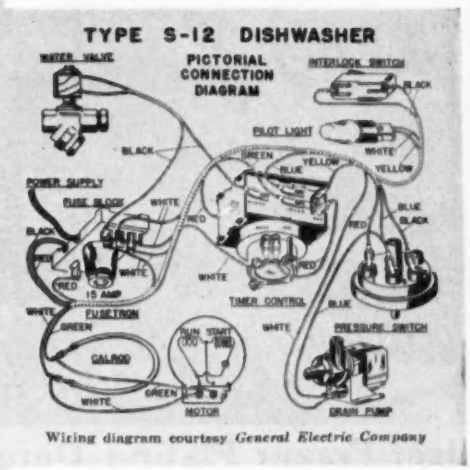
Back in 1937, the Ark-Les Switch Corporation pioneered the development of a low-cost, fast-assembly, mechanically secure method of wiring electrical systems. The result was the Ark-Les QUICK-CONNECT terminal—first patented in 1943.



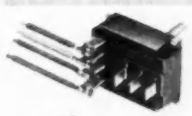








Wiring diagram courtesy *General Electric Company*





the savings

Production men report Ark-Les QUICK-CONNECT terminals cut wiring time up to 60% in assembling ranges, refrigerators, water heaters, panel boards, and all kinds of electric and automotive apparatus. Your own time-study figures will prove the savings realized in eliminating screw connections in the General Electric dish washer diagrammed above.

acceptance

of this money-saving idea is proved by the fact that "QUICK-CONNECT"—in various spellings—is now the standard term for the fastest wiring method. Manufacturers all over the country now incorporate these simple, safe, economical connections in their products—some under license from Ark-Les, and some in frank and successful imitation.

The engineering imagination that originated the "QUICK-CONNECT" terminal can cut your wiring costs. For details, write to the originators . . .

ARK-LES SWITCH CORP.
51 Water St., Watertown 72, Mass.

(Continued from page 93)

Bearing—Various—$104,371
Spare parts—Various—$284,526
Rings and stands—Various—$72,298
Spare parts—Various—$3,007,234
Spare parts—Various—$754,537
Spare parts—146 ea—$64,650

U. S. Steel Corp., Detroit, Michigan
Artillery parts—378 pc—$995,126

—W—

Westinghouse Electric Corp., Washington, D. C.
Special tools—$650,000

Willys Motors, Inc., Toledo, Ohio
Trucks, light—35 ea—$52,627
Jeeps—5 ea—$17,477
Station wagons—5 ea
Jeeps and spare parts—155 ea—$234,060
Jeeps and spare parts—7 ea—$113,626

BOOKS . . .

AIR CONDITIONING MANUAL, *published by The Trane Co., La Crosse, Wis. Price, $5.00.* The present 380-page edition of this book contains a new fan chapter to cover fan application and selection, basic fan laws and duct design data and nomenclature. This chapter adds to the manual complete information on design of air handling systems for air conditioning. The text is illustrated with drawings, photographs, charts and graphs. Problems at the end of each chapter show practical applications; answers are given in a separate section. A reference section contains standard tables on air, refrigerants, pipe capacities for refrigerant liquid and vapor and ducts. The new fan chapter is available separately for $1.00.

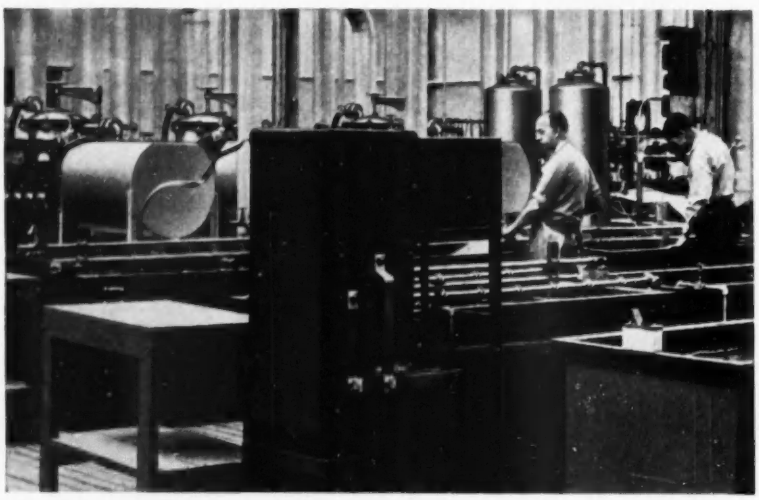
THE FEDERAL DEBT: STRUCTURE AND IMPACT, *by Charles C. Abbott, published by The Twentieth Century Fund, 330 West 42nd St., New York 18, N. Y. Price, $4.00.* The author notes the dizzying rise in our debt from its already high figure of close to $41 billion in June, 1939, to its peak of nearly $280 billion in February, 1946—a sevenfold increase. The debt now stands at around $260 billion and is one of the central economic facts of our times. This book analyzes what kinds of obligations make up the debt, who holds them, the effect of interest rates and the enormous leverage exerted by the debt on every section of our economic system. It includes a final chapter of recommendations for wise management of the federal debt, prepared by an impartial committee of authorities in the field.

TRADER HANDBOOK, *published by Trader Publishing Co., Ltd., Dorset House, Stamford St., London, S.E. 1, England. Price $2.75.* The 1953 edition of this book provides nearly 500 pages of essential information for manufacturers, trade suppliers, and repairers of motor, motorcycle, and cycle goods. It should prove a great value to firms overseas seeking contact with British suppliers. A new feature of interest to the motor vehicle service engineer is a table of "Front End" Service Data giving caster angles, camber angles, king pin inclinations, and toe-in for various makes of vehicles. In the Buyer's Guide section the space given to suppliers of motor vehicle spare parts has been greatly enlarged and now covers nearly 170 different makes.

ENGINEERING: A CREATIVE PROFESSION, *published by Engineers' Council for Professional Development, 29 W. 39th St., New York 18, N. Y. Price, $0.25.* Aimed at the young person who is considering engineering as a career, this pamphlet provides a detailed analysis of the engineering profession and the preparation needed for the field. Each of the many phases of engineering, and the work it involves is thoughtfully studied.

ASTM STANDARDS ON COPPER AND COPPER ALLOYS, *published by American Society for Testing Materials 1916 Race St., Philadelphia 3, Pa. Price, $5.00.* This book brings together in convenient up-to-date form all of the ASTM Standards pertaining to copper and copper alloys. The 1953 edition includes in their latest form 115 widely used ASTM standards, including 102 specifications; nine test methods; two recommended practices —one for tension test specimens for copper-base alloys for sand castings, the other for designating significant places in specified limiting values; and two classifications—one for cast copper-base alloys, the other of copper. A high percentage of the material included in the earlier edition has been revised, and four of the methods are new.

YOUR AUTOMOBILE — HOW TO UNDERSTAND IT, *published by Socony-Vacuum Oil Co., 26 Broadway, New York 4, N. Y. Price, $1.00* Amply illustrated this 96-page booklet offers a complete text on today's car in clear and simple terms. It is not, however, a manual telling how to diagnose and correct mechanical troubles.

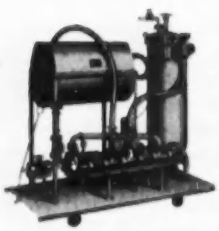


Kaiser-Frazer Plating Department Uses INDUSTRIAL Filters and Demineralizer

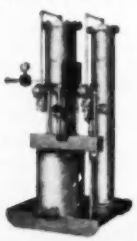
This view of one of the most diversified and completely equipped plating departments in the automotive industry shows three Model 2 INDUSTRIAL filters used for filtering cyanide plating solutions.

The INDUSTRIAL demineralizer is used for supplying chemically pure water for the various plating operations.

This plant has also (not shown) one INDUSTRIAL filter on chrome solution and four other INDUSTRIAL filters on silver and fluoborate solutions.



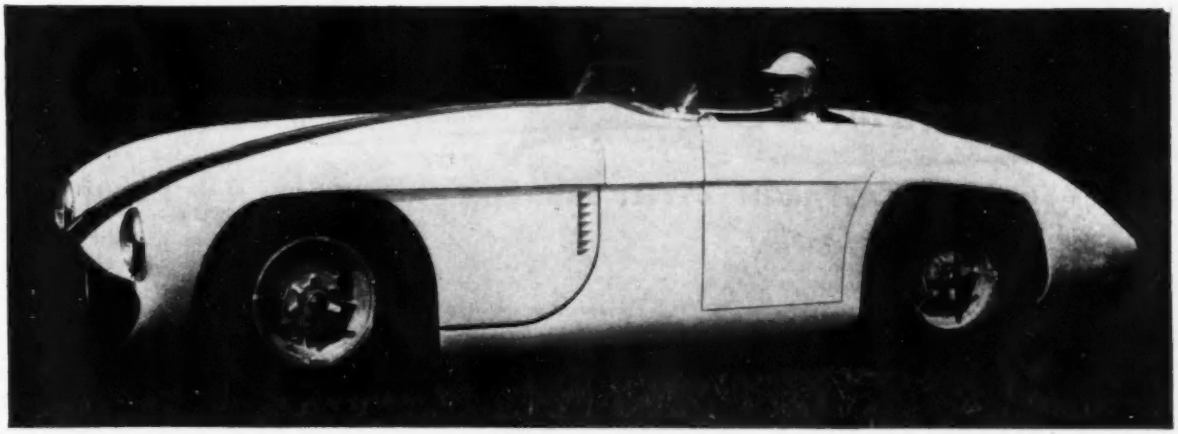
Standard INDUSTRIAL filters are available in capacities of 100 to 15,000 gph. Standard INDUSTRIAL demineralizers have capacities of 100 gph. up. Complete recommendations for any job upon request.



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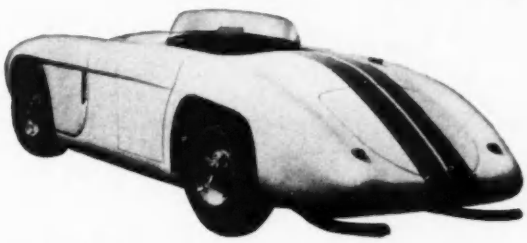
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DEMINERALIZERS
RUBBER LININGS
CORROSION TEST CABINETS
HEAT EXCHANGERS



THOMPSON ENGINEERS PISTONS FOR:

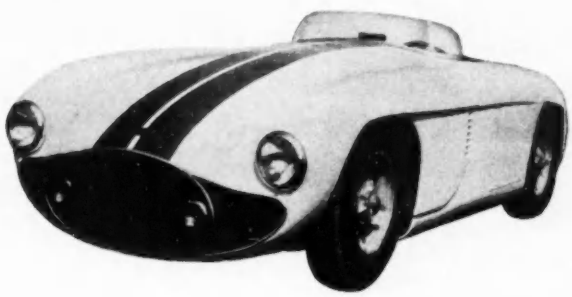
AIRPLANES
CARS
TRUCKS
BUSES
TRACTORS
***...and* RACING CARS**





One of the three Cunningham racers, all of which finished in the first ten places in the recent Le Mans 24 hour race. Nicknamed "Le Requin Souriant" (the smiling shark) by the French, the famed speed cars were equipped with special Thompson built pistons.

Speaking of the pistons which were precision-engineered by Thompson's Light Metals Division, Phil Walters, driver of the C-5R which set a new record of 152.5 mph for one kilometer during the Le Mans race, says, "the pistons worked perfectly."



THE special pistons precision-engineered for the famed Cunningham racers serve as an added indication of Thompson's Light Metals Division versatility.

The same manufacturing techniques and skills are used in producing precision-engineered pistons which work perfectly in gasoline and diesel engines for passenger cars, trucks, tractors and buses.

And, Thompson's Light Metals facilities are not limited to piston manufacture—light, strong, durable metal castings are constantly being engineered, designed and produced for a wide range of customer uses.

A background of over 50 years in research and manufacture of precision metal parts enables Thompson to offer aid to all forms of industry. Today it is producing light metal castings for such diversified products as aircraft and washing machines; buses and garbage disposers; tractors and outboard motors; automobiles and industrial engines.

Regardless of your product, if you use castings, Thompson's creative engineers will gladly show you when and how you can simplify your operations and save on costs with Thompson's Light Metal castings.

For a detailed description of the Thompson Light Metals Division operations, send for your free copy of "Creative Castings". Just write, on your company stationery, to Dept. A-3, Light Metals Division, Thompson Products, Inc., 2269 Ashland Road, Cleveland 3, O.

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BELLWOOD, ILLINOIS
Established 1872

News of the MACHINERY INDUSTRIES

(*Continued from page* 63)

minimizing of electrical trouble calls on machine tools. These were:

1. Form and lace all wiring in control enclosures to avoid excessive bulk and permit more rapid tracing and checking when trouble occurs.

2. In stall reversing magnetic starters, where required, for all except fractional horsepower motors.

3. On fractional horsepower motors use a drum switch for reversing control if desired, but interrupt the motor load by a magnetic starter and not the drum switch. Some operators prefer the feel and physical action of drum switches, however, maintenance records indicate unsatisfactory life when the full motor current is broken.

4. Electrically interlock the push buttons for reversing and multi-speed starters.

5. Consolidate controlling equipment in a common enclosure whenever possible.

6. Eliminate splices and use of equipment lugs for multi-wire connections by incorporating adequate terminal blocks.

7. Leads to movable parts should be extra flexible wire.

8. Flexible conduits should be made mechanically and electrically secure in all connectors with approved parts.

9. Identify all wires on both ends by approved markers even if wires connect to labeled terminals.

Concerning production problems in the aircraft industry, Mr. Davis stated that, due to rapidly changing airframe designs and low volume production, normal machines undergo numerous setups during relatively short periods. Motorized adjustments on power brakes, hydraulic presses, power shear back gages, punch presses, sheet rolls, and other equipment would fill a serious need in airframe manufacture, according to the spokesman.

In respect to machine tool procurement, it was recommended that quotations to the purchaser state physical size of control cabinets, power panels and other auxiliary equipment. Recommended minimum clearances on all sides of major and minor components also should be defined. Without the aforementioned information, according to Mr. Davis, it is not possible to intelligently plan shop layouts which must be prepared months before installation. He also suggested that

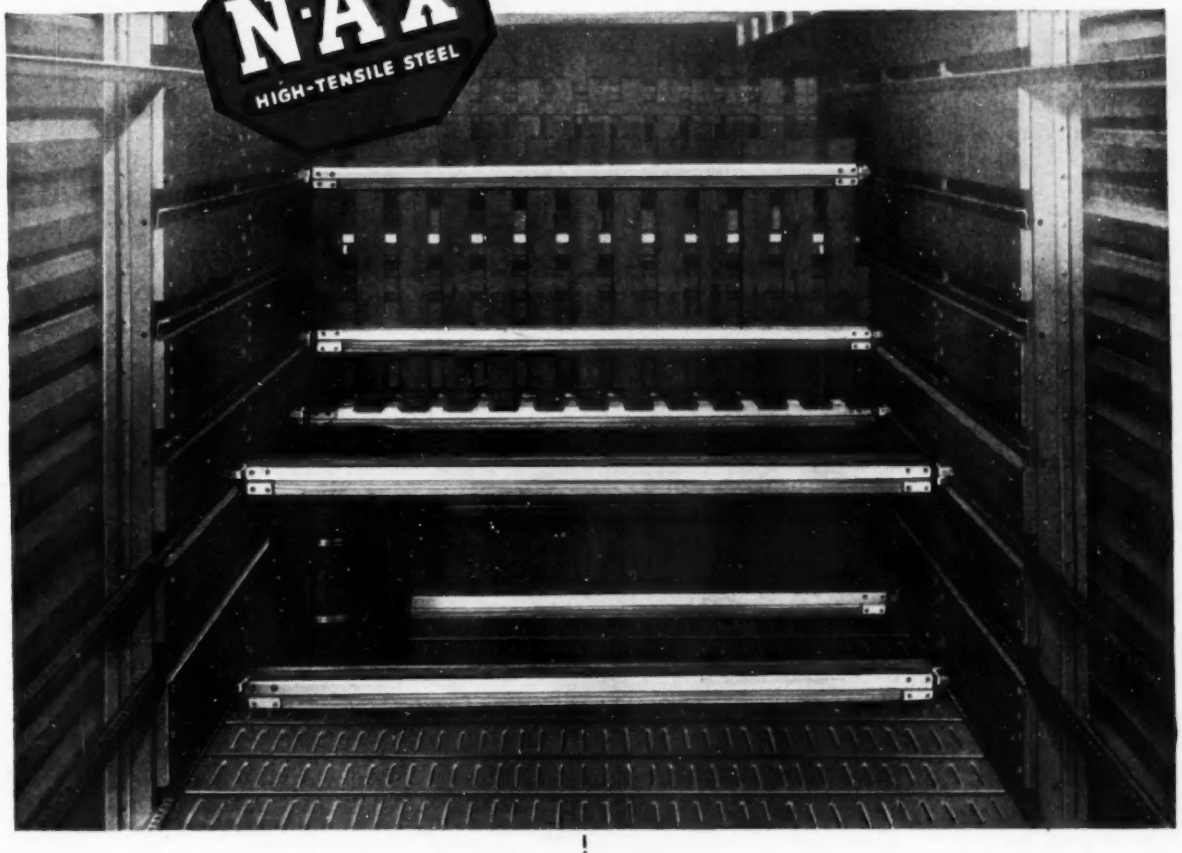
for Greater Strength with Lighter Weight

in modern material handling equipment

The increasing use of the Evans DF Loader reflects the progress of railroads toward more efficient material handling methods.

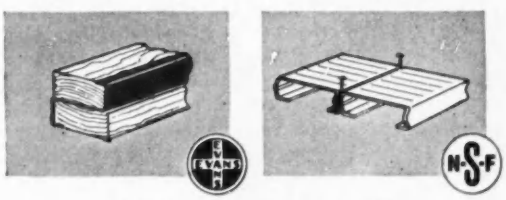
In the DF Loader there is high strength with minimum weight through the use of N-A-X HIGH-TENSILE steel. This low-alloy steel has 50% greater strength than mild carbon steel, with greater resistance to corrosion with either painted or unpainted surfaces.

You can get the same results as Evans. Your product can be made stronger, lighter in weight and longer-lasting, when you specify N-A-X HIGH-TENSILE steel.



THE EVANS DF LOADER is a product of Evans Products Co., Plymouth, Mich. DF means Damage-Free, Dunnage-Free.

NAILABLE STEEL FLOORING for boxcars, flatcars and gondolas is made of N-A-X HIGH-TENSILE steel, and is a product of Steel Floor Division, Great Lakes Steel Corporation.



Engineering data on these products available upon request to the manufacturers.

The "Wonder Bar," a section of which is shown at left, is a vital part of the Evans DF Loader. It is a wooden bar reinforced by a Z-bar made of N-A-X HIGH-TENSILE.

The "Wonder Bar," when locked into place, secures all kinds of lading. It is strong enough to resist shifting load stresses in moving boxcars, yet so light that one man can lift it into position. The DF Loader provides real operating economies for both railroads and shippers.

Another modern product for efficient transportation equipment is Nailable Steel Flooring, also made of N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION

complete prints of machine outline, foundation, conduits and piping requirements and installation instructions, with ideal and alternate layout of components, be forwarded to the customer on receipt of purchase order.

Concerning new machine requirements, the speaker reported four items of special interest to the aircraft builders. These are as follows:

1. Production of form blocks is one of the bottlenecks that plague the airframe industry. If a machine tool was available that could finish mill form blocks, from a saw cut plate, many of the present operations could be eliminated. Such a mill should be capable of operating through a range of plus or minus 20 deg from perpendicular to the base. Control of contour and bevel should be obtained from lines appearing on photo-print detail.

2. A machine is needed that will simultaneously produce male and female pierce blank dies. The male punch material is usually SAE 4140, while the female die may be of the same material but is usually kirksite. The tolerances of male and female dies should be consistent with recommended practices for this type of operation. Here again, lines appearing on photo-print detail should control the actions of the cutters.

3. The aircraft makers would like to have industry produce a 360 cycle motor, approximately 15 hp, to sell as a package. This should include alternators, controls and motor plugging features. This motor would be widely used for routing and high-speed milling.

4. A machine is desired that will rapidly, accurately and economically produce helical templates. These templates will replace the present linear templates that are fastened along the length of the bed of the spar milling machines. The advent of long spar mills with multiple carriages makes the use of linear templates almost prohibitive. The solution seems to be individual helical templates for each carriage.

Automatic Control

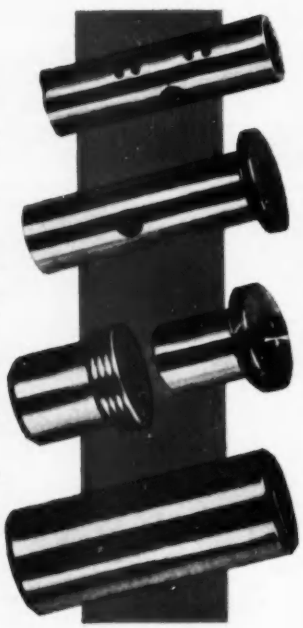
Speaking on automatic machine control, Perry L. Nies, Ultrasonic Corp., stated that computer and servo specialists believe that machine tool builders are their best potential customers. He said that machine tool operation with its changing feeds, motions, and sequence of cuts, as well as close tolerances, probably is the closest thing to the military applications that fostered the control development.

The speaker went on to say that at least six machine tool builders are actively engaged in the computer and servo control program and that many others are contemplating control engineering programs.

Mr. Nies, in mentioning interesting combinations of advanced controls and machine tools, considered a locating table used to position a workpiece beneath a drill spindle. The table is directed to successive positions by punched paper tape encoded with coordinate specifications for each position. Such a device, according to the speaker, would conceivably offer the user advantages as follows: elimination of positioning fixtures; ease of change of specifications; reduction of setup time; reduction in spoilage; high accuracy of reproduction, piece to piece; and high accuracy of relocation, for successive drilling, etc.

Principal obstacles to be overcome before the equipment is offered commercially center around chip removal and high initial control cost, it was reported. But, stated Mr. Nies, the locating table directed by paper tape represents a tool and control combination useful for a very common machining operation with potential widespread application.

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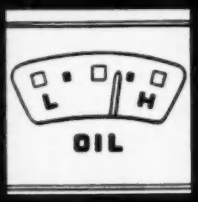
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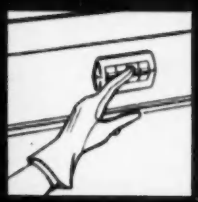
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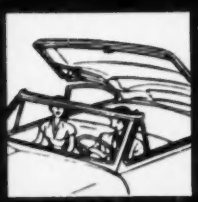




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HOW NYLOK LOCKS
(Patented)
Resilient Nylon plug (A) sets up lateral thrust, smoothly wedging mating threads together (B). All of locking action is on the threads; head is not stressed. Locking is positive seated or unseated

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Eliminates safety wire, lock washers, jam nuts, and all other locking devices.

The new Holtite-Nylok screws and bolts employ a nylon insert in the threaded section that provides a smooth, positive locking action. Seated or unseated, they lock where stopped.

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25 September 1953

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BOOKS . . .

PRINCIPLES OF AUTOMATIC CONTROL, *published by Instrument Society of America, 1319 Allegheny Ave., Pittsburgh 33, Pa. Price, $1.25.* This 32-page booklet is the text of a film on principles of automatic control. It describes in detail the justification of: automatic control; design of an automatic controller; and application of a controller to a process.

WELDABILITY OF STEELS, *by Robert D. Stout and W. D'Orville Doty, published by Welding Research Council, 29 W. 39th St., New York 18, N. Y. Price, $6.50.* Since it is impossible to discuss weldability without reference to welding processes and metallurgy, the early chapters of this 381-page book cover briefly the fundamentals of these subjects in relation to weldability. Next comes consideration of the basic factors which influence the weldability of carbon and low-alloy steels, after which are presented suggested methods for welding commonly used steels. The remaining chapters contain a review and critical evaluation of weldability tests and general conclusions on our knowledge of weldability. Perhaps the most widely useful part of the book is an appendix consisting of 50 pages of tables wherein all of the standard specification steels, such as ASTM, SAE, ABS and others, are classified into three categories: those which are readily weldable; those in which some precautions are needed; and those which require special precautions and considerations. Exact welding procedures are indicated for each thickness of steel.

AUTOMOBILE CHASSIS DESIGN, *by R. Dean-Averns, published by Iliffe & Sons, Ltd., London, England. Copies available from The British Book Center, 420 W. 45th St., New York 36, N. Y. Price, $6.75.* The enlarged second edition of this book contains new chapters on the techniques of independent suspension and chassisless construction. There is also a great deal of new material on methods of stress measurement, anti-corrosive treatment of metals, road spring design, streamlining, etc.

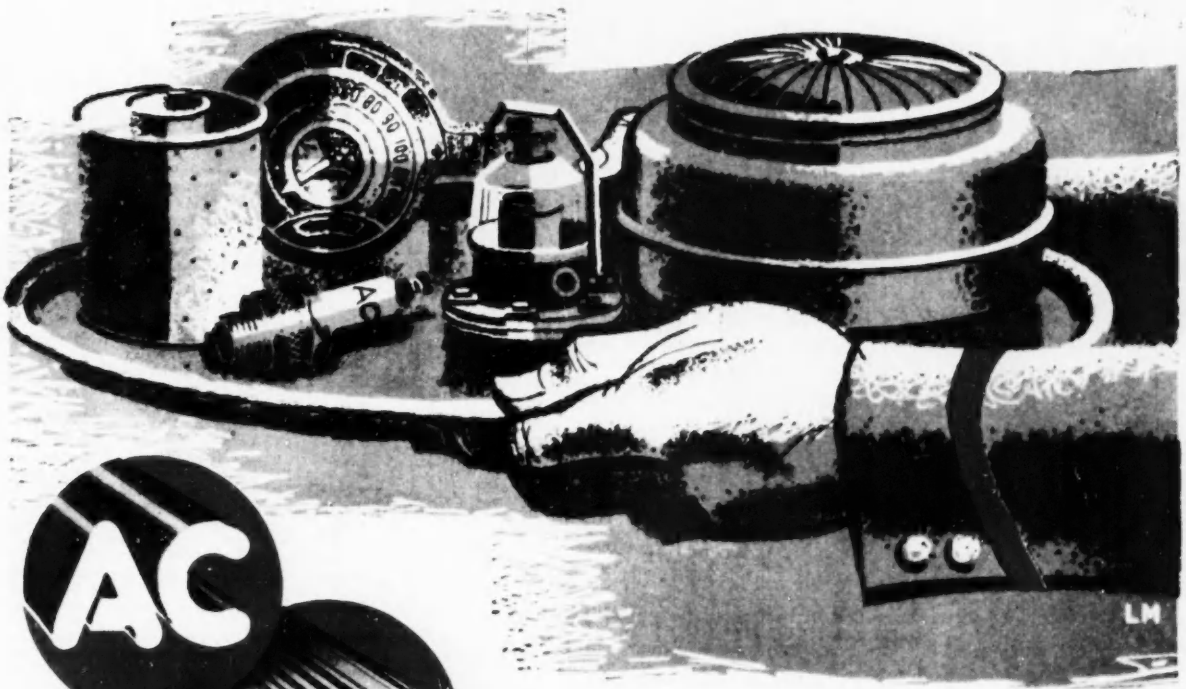
THE HIGH-SPEED INTERNAL-COMBUSTION ENGINE, *by Sir Harry R. Ricardo, published by Blackie & Son, Ltd., London, England, distributed in the U. S. by Autobooks, 2708 Magnolia Blvd., Burbank, Calif. Price, $11.00.* The first edition of this book was published in 1923. Since then there have been sweeping developments in the design of high-speed internal-combustion engines, and the author felt that no mere revision of his work was possible. He has, therefore, completely rewritten this fourth edition. As a leading consultant in this field, the author is in an unusually strong position to write from direct experience. The result is a book which will be read with profit by anyone interested in internal-combustion engines, not only for the information it contains, but also for the skill and discrimination displayed in the analysis of the many complex problems that arise. Included in the contents are such subjects as: combustion; detonation and pre-ignition; efficiency; latent heat; distribution of heat; combustion-chamber design—spark ignition; combustion-chamber design—compression ignition; cold-starting of compression-ignition engines; mechanical efficiency; supercharging; the two-cycle engine; mechanical design; pistons and piston cooling; cylinder wear; piston aero-engines; sleeve-valve engines; two-stroke sleeve-valve engines; and engines for research.

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AC SPARK PLUG DIVISION GM GENERAL MOTORS CORPORATION

BOOKS . . .

TAX SHELTER IN BUSINESS, *by William J. Casey and J. K. Lasser, published by Business Reports, Inc., One Main St., Roslyn, L. I., N. Y. Price, $12.50.* We are living in a tax-motivated economy and, in shaping business policy, tax planning now shares the stage with basic economics, according to the authors of this research study. They gather the main strategies and policies through which a business may hope to hold its own and even to grow in the face of today's tax structure. With the Government a silent partner, participating in the winnings and not always sharing in the losses, the businessmen who have made their companies grow stronger and expand during the post-war period are those who know how to protect their operations from an excessive call from the tax collector. In their study, the writers cite dozens of methods and scores of instances by which leading businesses and leading businessmen have moved in recent years and are moving today to protect their operations from the tax structure.

SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES, *published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, $3.25.* The papers and discussions in this Symposium concern the effects of notches on metals at elevated temperatures, under either static or dynamic loading, and discusses results of current research on the subject. It also deals with another aspect of the behavior of metals at elevated temperatures, namely, the metallurgical changes which occur during heating at elevated temperatures, and the effects of these on strength and ductility.

WELDING PREHEAT AND INTERPASS TEMPERATURE CALCULATOR, *published by The Lincoln Electric Co., Cleveland 17, O. Price, $0.50.* This calculator uses slide rule principles to permit quick and accurate calculation of the preheat and interpass temperature required when the hardening or cracking tendency of metal being welded can be minimized by preheating. The amount of preheat will vary depending on the chemical analysis of the metal and the thickness. When the analysis and thickness are known, the calculator, working from this information, gives the amount of preheat required for a satisfactory welding procedure. The percentage present of elements such as carbon, manganese, silicon, phosphorus chromium, nickel, molybdenum, vanadium and copper are worked into the calculation, along with metal thickness ranging from ½ in. to 10 in.

FIBERGLAS AUTO BODY CONSTRUCTION, *by John A. Wills, published by Dan R. Post Publications, Arcadia, Calif. Price, $3.00.* Written in plain language, this 95-page manual is said to be comprehensive enough to enable the reader to build his own plastic car body. Its coverage includes sections devoted to: materials, models, parting agents, molding the body over the male or model, construction of the female mold, quantity production molding methods, structure, finishing, filling, painting, repairs, and appendix of suppliers.

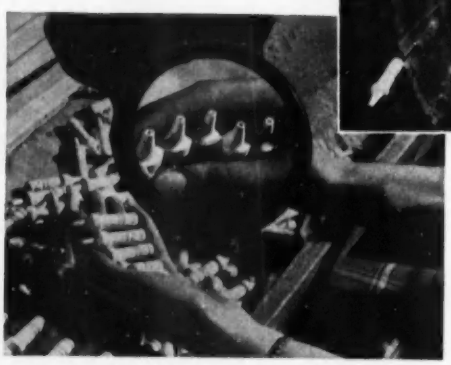
COMPANY PRACTICES IN MARKETING RESEARCH, *by Richard D. Crisp, published by American Management Association, 330 W. 42nd St., New York 36, N. Y. Price, $2.50.* Long aware of a rising interest in marketing research, AMA last year undertook a study of this subject among 180 of its member companies. The findings are compiled in this report. Valuable information is provided on such topics as how much companies are spending for marketing research today and how these expenditures vary with company size.

THE WORLDLY PHILOSOPHERS, *by Robert L. Heilbroner, published by Simon and Schuster, Inc., 630 Fifth Ave., New York 20, N. Y. Price, $5.00.* This book is the story of the lives, times, and ideas of the world's great economic thinkers, such as Adam Smith, Parson Malthus, David Ricardo, John Mill, Robert Owen, Karl Marx, Henry George, Thorsten Veblen, John Keynes, and Joseph Schumpeter. The influences which they exerted on past generations, continue to exert today, and will exert on posterity cannot be measured by any common yardstick, for they are infinite. In short, their ideas about business and society have become the causes for which men work and fight and die. As such, they make fascinating reading that serves to shed light on the mysteries of the economic forces which stir the world today.

WELD STANDARDS, *published by The Lincoln Electric Co., Cleveland 17, O. Price, $1.00.* These standards have been published to enable the engineers of machinery manufacturers and fabricators to acquire both cost and quality control over welding operations. They are available on tracing paper so that they can be blueprinted or otherwise reproduced for the purpose of giving engineers and production personnel a standard for communicating welding procedure on drawings. The standards, with a simple letter designation, specify, according to plate thickness, both the type and size of weld as well as how it should be made.

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Every insulator must pass this dielectric test—30,000 volts at 1.5 megacycles.

Surface inspection of every insulator made before and after glazing.

It takes quality control measures, like these shown, on every piece (not just a spot check) to insure the performance you are looking for in spark plug insulators—to meet high voltage requirements of combustion chamber temperatures.

That's one reason you'll find FRENCHTOWN insulators used by more independent spark plug manufacturers than those of any other producer of insulators. To minimize breakage due to heat shock, specify insulators by FRENCHTOWN.

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EVANITE

the only battery separator with all these advantages!



Uniform high quality—every Evanite separator is identical whether you compare two or two million.



Evanite is an improvement over nature! Wood has long been recognized as the most satisfactory low cost separator material. Now the new Evanite *interwoven wood fibre* separator utilizes wood in improved form. Evanite separators, tested in 20,000 batteries in daily use up to three years, have delivered more than their guaranteed battery life without a single separator failure.

Write today for full details on Evanite—Made *only* by Evans Products Company, Western Division, Dept. P-11, Plymouth, Michigan. Mills at Coos Bay, Ore.; Roseburg, Ore.; Vancouver, B. C.

Ask your battery manufacturer for complete product and case history information on the advantages of Evanite.

Compare These Advantages of Evanite Separators

TESTED IN 20,000 VEHICLES for periods up to 3 years under actual operating conditions.

OUTSTANDING PERFORMANCE, equalling or surpassing conventional separators.

NO SPLITS, NO CRACKS—Completely uniform. No candling required.

NO TREATING, NO WET HANDLING—Treated at the factory and shipped *dry*.

CUTS SHIPPING COSTS—Much lighter than ordinary separators.

ECONOMICAL—Cost no more than ordinary treated wood separators.

BACKED BY EXPERIENCE—Produced by Evans, whose years of experience are your assurance of finest quality.

EVANS — ***WORLD'S LARGEST MANUFACTURER OF BATTERY SEPARATORS***



CLARK UTILITRUCS handle the toughest jobs at least cost!

...they're engineered to satisfy driver, maintenance man, management

Here are the most advanced 6000-7000 lb. fork trucks on the market today—Clark's gas or electric UTILITRUCS. Built to handle jobs that break the backs of less rugged trucks, these UTILITRUCS have proved their superiority in foundries, steel mills, stevedoring* and heavy warehousing. They represent an ideal balance of essential engineering features. They get more work done at less cost, for these reasons:

1. Easier to drive

All controls at the driver's fingertips, like an automobile; compact and more maneuverable; shockless steering; increased braking efficiency; 140 sq. inches additional visibility; 25 inches of free-lift; DYNATORK or HYDRATORK DRIVE available on gas model.

2. Easier to service

Complete accessibility for maintenance. On gas model: one-piece "zipper" hood folds back to expose engine; one-piece floorboard lifts up to expose master cylinder and transmission; swing-out battery. All service points easy to reach.

3. Built to take punishment

Welded, integral-unit box frame eliminates distortion; higher inch-pound rating; axle-to-frame mounting absorbs shocks and strains; new design wheel and backing plate seals out dirt and abrasives. Oil bath air cleaner and oil filter standard on gas model. Totally-enclosed drive motor, sealed-for-life bearings on electric model.

We invite you to compare the UTILITRUCS to any 6000-7000 lb. truck on the market! Without obligation, you can discuss them with your nearby Clark dealer, listed in the Yellow Pages of your phone book. Or write us for free descriptive literature.

*Special stevedoring model available

1903 1953 CLARK EQUIPMENT

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 68, Michigan



Government planners appear sympathetic to the machine tool industry's bid for permission to channel a greater proportion of its output to non-defense uses. However, they drop no hint as to whether or not—or when—they'll grant the industry request.

Use of alkylate in automobile gasoline has been approved by the Government until Jan. 1. The ban on its use was lifted because output of aviation gas is greater than the expected demand.

Beginning next year, monthly output of shells is to begin a gradual decline. Under present plans, dollar value of monthly shell output will probably drop to around $200 million by mid-year, and to about $170 million by Jan. 1, 1955.

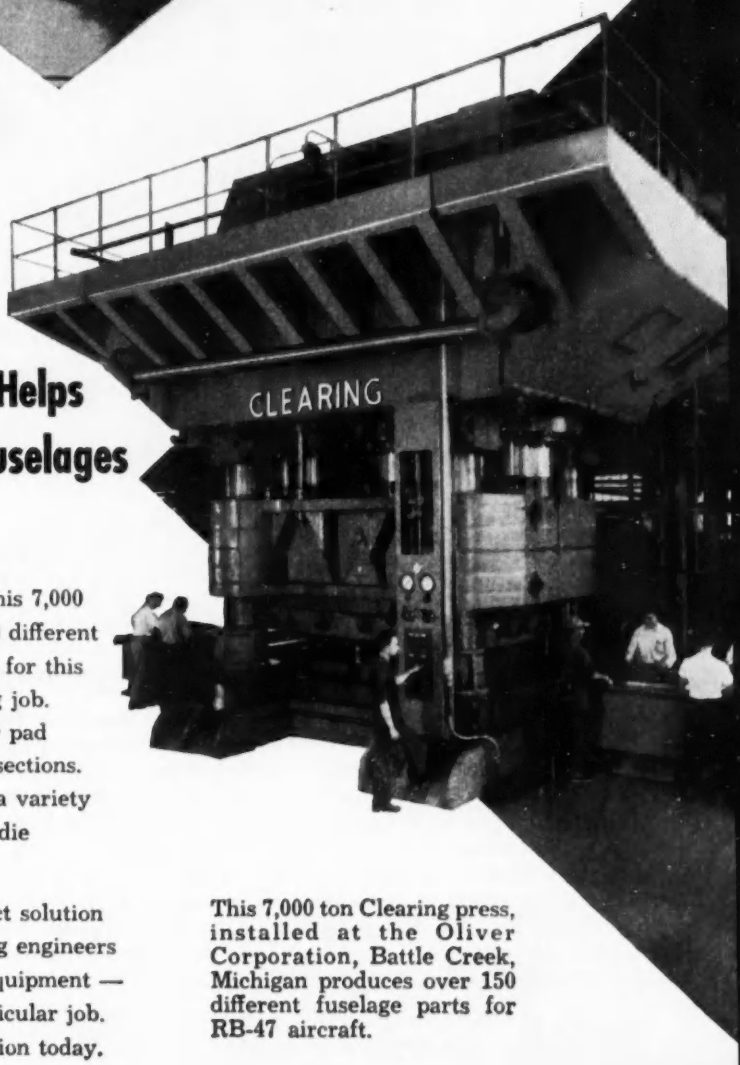
A revised allocation of commercial carrier aircraft to the Civil Reserve Air Fleet (CRAF) has been announced by Defense Air Transportation Administration. The number of four-engine aircraft to be contributed by certificated and non-certificated civil air carriers has been increased from the previous number of 294 to the present 308. In addition, 23 aircraft have been designated as a contingency reserve.

Disposal of its synthetic rubber factories may be a tougher job than the Government expected. It is reported that there are several unreasonable requirements in the plant disposal law which took effect last summer.

Sidetracking of highway-use tax revenues into non-highway projects is beginning to look less serious. Twenty-five states and the District of Columbia last year channeled about 24 per cent less of their highway taxes into such projects than they did in 1951.



A 7,000 Ton Push



Giant Clearing Hydraulic Helps Oliver Produce Aircraft Fuselages

Backing the assembly line at the Oliver Corporation in Battle Creek, Michigan, this 7,000 ton Clearing hydraulic produces over 150 different components for RB-47 fuselages. Tooling for this number of parts would seem a staggering job. Not with this giant Clearing. The rubber pad principle provides for one-half of all die sections. Fairing strips, cover plates and webs, in a variety of sizes, are quickly formed from simple die arrangements.

This 7,000 ton hydraulic was the correct solution for Oliver's production problem. Clearing engineers are ready to help you choose the right equipment — hydraulic or mechanical — for your particular job. Call or write Clearing Machine Corporation today.

This 7,000 ton Clearing press, installed at the Oliver Corporation, Battle Creek, Michigan produces over 150 different fuselage parts for RB-47 aircraft.

CMC

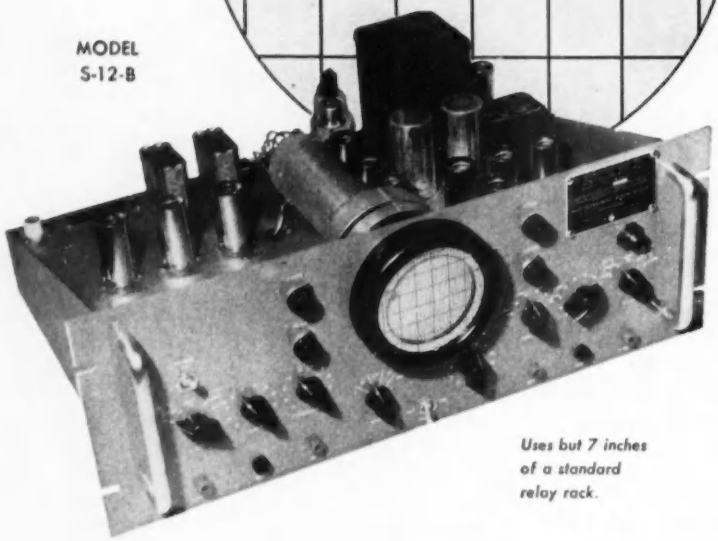
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THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION, 6498 West 65th St., Chicago 38, Illinois • HAMILTON DIVISION, Hamilton, Ohio

the Waterman JANized RAKSCOPE®

MODEL S-12-B



Uses but 7 inches of a standard relay rack.

ANOTHER EXAMPLE OF Waterman PIONEERING...

The S-12-B RAKSCOPE is a rack mounted, JANized version of the famous WATERMAN S-11-A POCKETSCOPE, with the addition of a triggered sweep and a special calibrating circuit for rapid frequency comparisons. The entire oscilloscope is built to occupy but seven inches when mounted in a standard relay rack. The vertical and horizontal amplifiers are identical, having sensitivities of 0.05 Volt rms/inch and frequency responses which are flat within —2 db from DC to 200 KC. These features permit observation of low frequency phenomena without undesirable trace bounce. The sweep rate is continuously variable from 5 cycles to 50 KC in either the triggered or repetitive mode with synchronization polarity optional. The return trace is blanked. Because provisions are made for applying input signals from the rear, as well as the front, the S-12-B is the ideal combination, systems monitor and trouble-shooting oscilloscope. Investigate the multiple applications of this instrument as an integral part of your "rack mounted" projects.

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S-11-A	INDUSTRIAL	POCKETSCOPE®
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WATERMAN PRODUCTS

SHORTIES

There will be 193 million people in the U.S. by 1975, they will be holding down 79 million jobs, and gross national production will be $566 billion, double that of 1950.

•

Seventy-one per cent of our industrial capacity and 54 per cent of the workers engaged in manufacturing are located in 50 large metropolitan centers.

•

Profits, after taxes, of all corporations in the U.S. during 1952 were $18.6 billion. Total Government expenditures, federal, state and local, were $94.4 billion for the same period.

•

About 25 per cent of new car buyers asked for black finishes in 1948. That percentage has dropped to 12 per cent.

•

Pressure at the earth's core is 46.5 million psi.

•

One out of every 20 employed persons in this country works for the transportation industry.

•

A major portion of the nickel delivered to steel foundries in 1952 was used in cast parts for armored combat vehicles.

•

Two gallons of today's gasoline will do the work of three gal of 1925 gasoline.

•

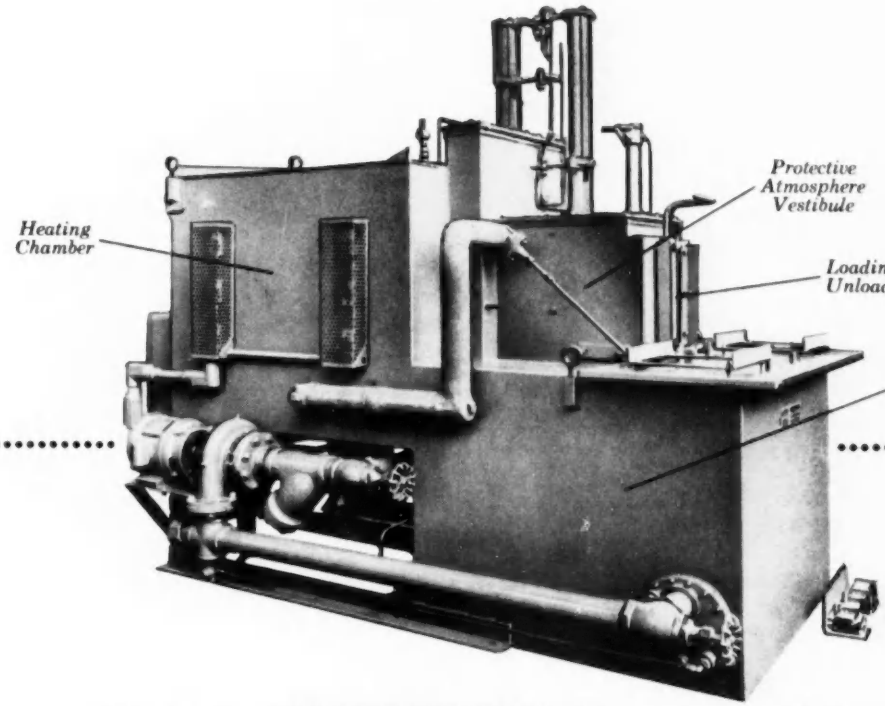
In ten days, working eight hours a day, a new electronic computer used in flight research can solve a problem that would take an expert mathematician 45 years.

•

At full speed, a late-model Navy fighter develops 10 times as much horsepower as a standard twin-engine airline transport.

•

Three times as much flying is done by America's utility airplanes as is done by the nation's airlines.



A new HOMOCARB® furnace with protected quench

Now, for the first time, work can be direct-quenched from a Homocarb furnace under a protective atmosphere.

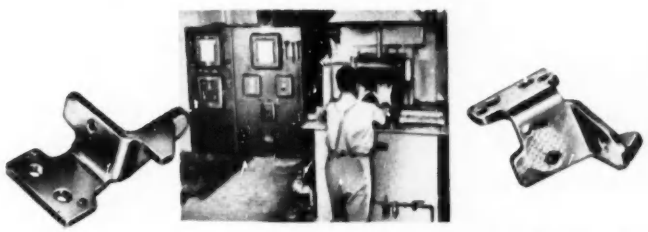
This new horizontal Homocarb combines the well known benefits of the Homocarb method . . . continuous, automatic control of time, temperature and atmosphere . . . with a protected quench. Work moves directly from the furnace to the quench under a protective atmosphere . . . without exposure to air.

Heat treaters, metallurgists and production men will quickly recognize that this new L&N Homocarb furnace—complete with Microcarb® atmosphere control—marks a significant step forward.

The complete equipment consists of:

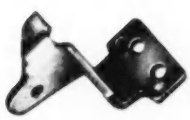
1. *The new horizontal Homocarb furnace with protected quench*
2. *Microcarb atmosphere control*
3. *D.A.T. three-function temperature control*

For complete information just write us at 4966 Stenton Avenue, Phila. 44, Penna.

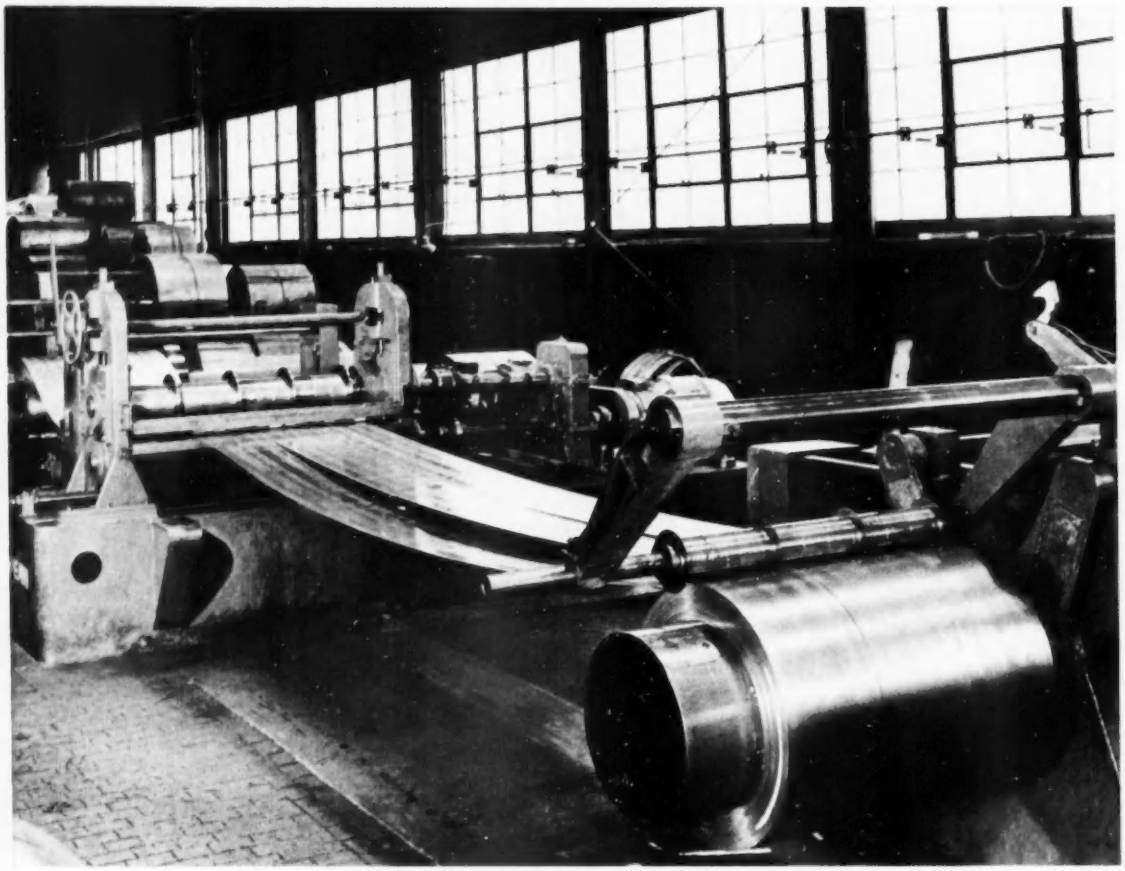


LEEDS LN NORTHRUP
instruments automatic controls • furnaces

Now IBM uses 1010 instead of 1065



At the IBM plant in Poughkeepsie, N.Y. they refer to their protected quench Homocarb as a "problem-solver". For example, the brackets shown ½ size, formerly made of 1065 steel to meet physical requirements, presented severe forming problems. Now IBM forms these parts of 1010 steel. They are then carburized in the Homocarb furnace at 1700 F to a surface carbon content of 0.65% and direct-quenched under protective atmosphere. Physical specifications are well within specified tolerances, and cost of forming has been sharply reduced.

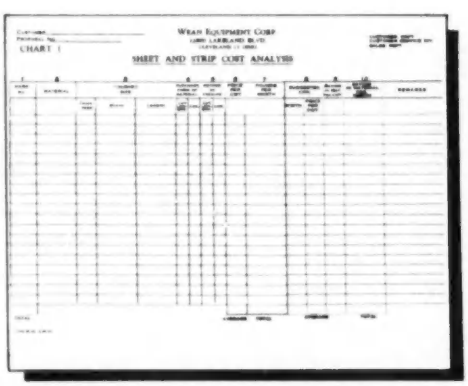


HERE'S HOW The WEAN Can Save You 20%

And

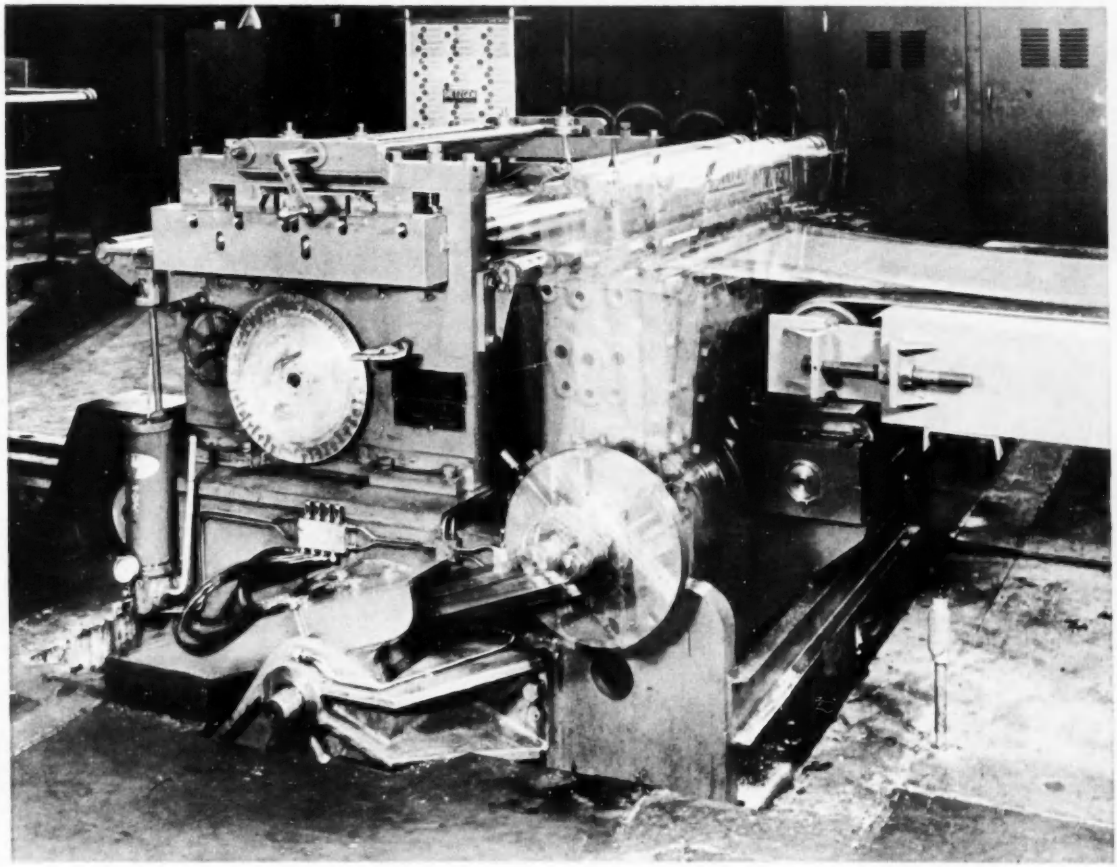
Here's A Simple Test That May Startle You

Want to save 20 percent on your steel costs? If you are using sheet steel in any great amounts a Wean Equipment engineer can quickly show you how the amazing new Wean Slitting and Flying Shear Line can effect this savings in your plant. Using your actual figures, Wean can, by a simple comparison method, quickly prove to you that these savings are possible. Why continue operating at high costs when this improved method could be saving you as much as $20 a ton on your steel?


CHART 1

WEAN EQUIPMENT CORP

SHEET AND STRIP COST ANALYSIS



Slitting and Flying Shear Line On Your Steel Costs

The secret of these tremendous savings is a short cut in getting steel from coil form to fabrication. If you are not one of those already using the Wean Slitting and Flying Shear Line you are either paying high mill extras for shearing to tolerance and size or are forced to do this operation expensively and slowly in your own plant or a costly combination of both.

The Wean Slitting and Flying Shear System eliminates this entire processing function by converting steel from coil to production size, at resquared tolerances, at a rate of 100 cuts per minute.

Just figure it out for yourself. Apply these figures to your own operation. Total up the extras you are now paying for steel preparation and you'll see why it will pay you to talk with Wean.

Wean

COMBINATION SLITTING and SHEARING SYSTEMS

WEAN EQUIPMENT CORPORATION OFFICES

Cleveland

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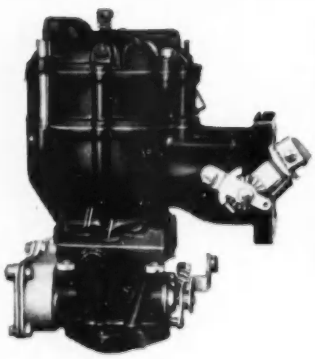
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Does Your Truck Have Sales Appeal?



IT ALL DEPENDS ON PERFORMANCE and PERFORMANCE DEPENDS ON

Zenith CARBURETORS



In the practical field of commercial transportation, product preference is determined solely on performance. Nothing contributes more to the achievement of this desirable end than efficient carburetion. You can be sure that manufacturers whose vehicles are equipped with Zenith, the leader in the field of heavy duty carburetion, have measured carburetion costs in lasting terms rather than initial expense. Zenith's rugged construction, strong idling, freedom from stalling and response to every power demand gives any commercial vehicle added sales appeal. It pays to specify Zenith — the engineers' choice for trouble-free operation.

ZENITH CARBURETOR DIVISION OF Bendix AVIATION CORPORATION

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New Fordson Tractor

(*Continued from page* 56)

rod bearings are of replaceable steel-back babbitted type. The governor is of pneumatic type having a speed range from 400 to 1870 rpm.

The clutch is of single-disk dry type with 11-in. disk. The transmission is of constant mesh type with six forward and two reverse speeds.

The engine has forced feed lubrication, using a gear type pump in conjunction with a screened oil trap. It employs pressurized cooling with a centrifugal pump and thermostat control. In addition, there are radiator shutters with manual control from the driver's seat.

The fuel system employs the Simms (Eng.) "four-way" fuel injectors and fuel injection pump. Fuel is drawn from the 19-gal tank through the sediment bowl of a standard diaphragm type fuel pump, then through a paper type micronic filter, final filtering being handled by means of a gauze filter on the fuel injector body.

The hydraulic system for implement control is operated from a gear pump located in the rear transmission housing, driven by the power take-off shaft. It operates at a speed of 744 rpm, giving an output of 4½ gpm at 2000 psi when engine speed is 1400 rpm.

Another interesting feature is the installation of a recirculating ball type steering gear which requires but little effort and provides positive control under all operating conditions.

Nut Runners

(*Continued from page* 53)

tightening of six bolts, originally was handled with a single power tool and the problem was to obtain more uniform torque. In January, 1952, the company put into service an I-R Model YA6A-1 multiple nut runner, a six-spindle tool that tightens all six bolts simultaneously. The 100 psi shop air is reduced to 95 psi at the tool to provide a torque of 80 to 85 lb ft. Tightening all the bolts at once insures more even torque and more equal loading of the six bolts and thus provides a stronger assembly. Also, this simultaneous application of uniform torque seats the flywheel evenly in its gasket and prevents leakage. Used alternately by two men, this one tool assembles the flywheels and crankshafts for every Cadillac built.



New Models at French Automobile Show

(*Continued from page* 45)

shoe subframe which carries the engine, suspension, steering, clutch and transmission. Attachment of the unit to the body is at three points on the horseshoe—one in front and one on each side—with heavy rubber blocks imposed. It is obvious that for repair work of any importance, there is great saving of time in breaking the gas and other connections and wheeling the unit forward. Apparently the only other firm which has adopted this system is Panhard on the new front-drive Dyna. The open propeller shaft is a standard type, with a central steady bearing. The rear axle is of the suspended type with a single rubber atachment point and two rubber blocks to absorb movements of the differential housing and lateral forces. Anchorage is provided by two radius arms, with the coil suspension springs mounted on their inner ends. A new type of steering gear has been adopted which is claimed to be particularly light and free from shock.

The engine of the new 180 is very similar to that of the 170S, but with the compression ratio increased to 6.7 to 1. Output from the four cylinders of 2.95 by 3.937 in., giving a piston displacement of 107 cu in., is 52 hp at 4000 rpm. Curb weight is 2530 lb. Wheelbase is 98½ in., and tread 55¾ in. at the front and slightly wider at the rear. Typical Mercedes lines have been retained, including the Mercedes false radiator, which is attached to the rear-hinged hood and lifts with it.

Since it was introduced, the Fiat 1100 has met with an unusual amount of success both in Italy and abroad, and has now been supplemented by the 1100 Turismo Veloce, or high-speed tourer. This four-cylinder, 66-cu-in., valve-in-head engine with a compression ratio of 7.5 to 1 has had its output stepped up to 50 hp, at 5200 rpm. No changes have been made in the general lines of construction, which is integral frame-and-body type, with independent front suspension and a hypoid rear axle with 4.3 to 1 ratio attached to the body by semi-elliptic springs. Fittings have been made more luxurious. Other Fiat models are the 500, 1400, and 1900. Fiat automobile production now profits immensely from the company's new steel mills, which produce cold rolled steel sheet of 61-in. width, the widest in Europe.

Automatic transmissions still fail to find favor in Europe. Rolls-Royce, Bentley and Jaguar fit American transmissions as optional equipment for the export market. Borgward has a completely automatic transmission, also as optional equipment. Renault has a two-range automatic transmission which is reserved for city buses and is built only in small quantities. Pont à Mousson, the French manufacturer of the Wilson gearbox, has developed an automatic gearshift which at present is applied only to governor-controlled Diesel trucks, and which automatically changes gears in relation to engine speed. Compressed air is the medium used, and as engine speed goes up one set of bands is released and the next higher set is brought into operation. The epicyclic



TUNG-SOL FLASHERS—
The Ideal Standard for Safe Automotive Signals

Make Driving Safer!

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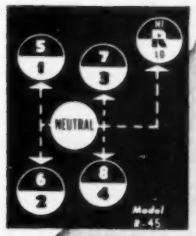
TUNG-SOL
SIGNAL FLASHERS

One lever controls

8 FORWARD SPEEDS

TWO REVERSE SPEEDS

NO GEAR-SPLITTING!



New MODEL R-45 ROADRANGER®

Now 125-160 hp rigs can have the advantages of the new R-45 ROADRANGER Transmission

The famous one-stick Fuller ROADRANGER is now available for rigs powered by engines delivering up to 385 pounds-feet of torque.

With the new R-45, gear-splitting is entirely *eliminated*. Shifts are simple, short, and fast, with only one power shift in the whole series. Yet you have 8 forward speeds—available in *equal*, progressive, selective steps, none exceeding 38%—to keep your engine *always* turning in its most efficient range.

With this transmission, there's no more engine lugging, no more low rpm between shifts. With the Fuller ROADRANGER, you can haul more, and maintain higher average speeds than ever before—with so much better utilization of horsepower that you make 1/3 fewer shifts. Write today for full information on the new Fuller R-45 ROADRANGER.

Check These Advantages:

- Easier, quicker shifts—38% steps—one shift lever controls all 8 forward speeds
- No gear-splitting—8 selective gear ratios, evenly and progressively spaced
- Higher average road speeds—engine operates in peak hp range with greater fuel economy
- Less driver fatigue—⅓ less shifting
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Installation Length . . . . . 29⅛"
Clutch Housing Sizes . . . . . SAE 1, 2, 3
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It's the Finish that Counts

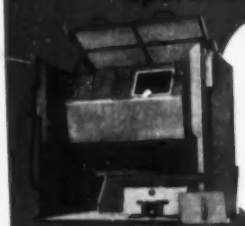
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THE PROPER FINISH ECONOMICALLY



There are other brands of materials that resemble Roto-Finish chips and compounds . . . but only Roto-Finish chips and compounds give you the *extra advantage* of continuous research by the company who originated the Roto-Finish processes. Roto-Finish chips and compounds are carefully manufactured so *you* obtain the best results on *your specific job*. To obtain the best results at the lowest cost . . . insist on ROTO-FINISH chips and compounds.

ROTO-FINISH puts your grinding, deburring descaling, polishing, brightening or coloring operations ON A MASS PRODUCTION BASIS



SAVES MAN HOURS AND MONEY by eliminating hand finishing.
GIVES ABSOLUTE UNIFORMITY...in any quantity.
MAINTAINS PRECISION TOLERANCES.
CUTS FINISHING costs as much as 80%.
LOWERS INITIAL and MAINTENANCE costs.

ROTO-FINISH COST-FREE ENGINEERING SERVICE GUARANTEES RESULTS

Put the experience and facilities of Roto-Finish to work for you on *your special finishing problems.*

Send a few unfinished parts to us . . . plus a finished part as a guide. We *guarantee* that you will get the same results on your plant that we produce in our laboratory. There's no obligation.



Write for fact-packed Roto-Finish catalog for complete information.

Roto-Finish COMPANY

ROTO FINISH

associated with The Sturgis Products Co.
3713 MILHAM ROAD, KALAMAZOO, MICH.

P. O. Box 988 — Phone 3-5378

FOREIGN REPRESENTATIVES: CANADA — Windsor — Roto-Finish Canada Limited • ENGLAND — London — Roto-Finish Limited — 39 Park Street — Mayfair • AUSTRALIA — Melbourne — A. Flavell Pty, Ltd. • HOLLAND — Delft — N. V. Roto-Finish Maatschappij — Rotterdamse — WEG 370A • AUSTRIA, GERMANY, SWITZERLAND — Frankfurt a.M. — Metallgesellschaft A.G., Germany • ITALY — Milan — Societa Roto-Finish a R.L. — Sesto S. Giovanni — Viale E. Marelli 31 • FRANCE — Paris — Sociote Roto-Finish, 70 rue de la Republique-Puteaux (Seine) • BRAZIL — Rio de Janeiro — Commercial E. Industrial de Formos Werco, Ltds.

construction renders the application particularly simple. The automatic operation can be overridden by hand control.

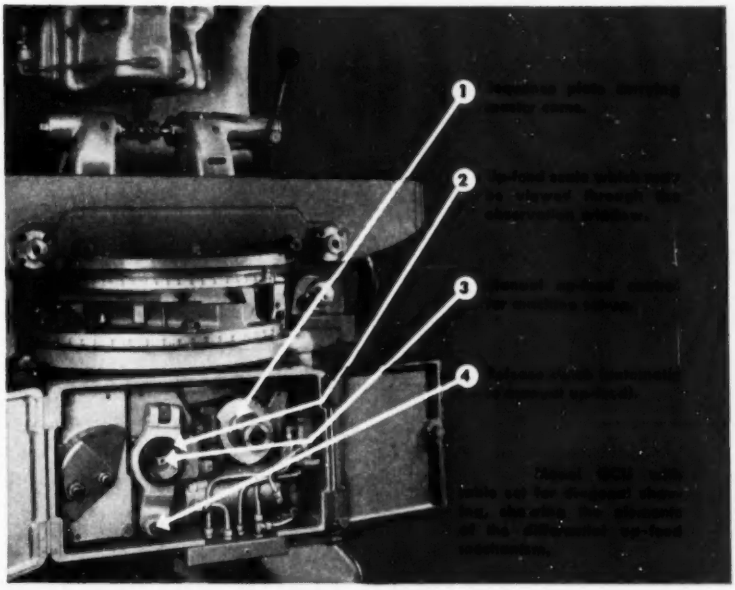
A few years ago the Paris Salon was never complete without a certain number of unusual designs which might or might not reach the production stage. This year there is only one which completely breaks away from conventional design. It is the Joymobile, produced in Holland by the Washmobile Co. to the designs of the French engineer Delettrez. A full width, large diameter tubular frame, united by transverse tubes of the same diameter, swept-in at the front and at the rear to accommodate the wheels, constitutes the platform of the Joymobile. A substantial bulkhead is welded to the tubes at the front sweep-in and carries the steering column and instrument board and there is a lighter sheet steel platform at the rear. The side tubes and the two main cross tubes are united by a welded-on sheet steel floor. Obviously the unit possesses unusual rigidity.

Ahead of the bulkhead, mounted between the two parallel steel tube frame members is a four-cylinder, four-stroke Diesel of only 108 cu in. piston displacement, bore and stroke being 3.15 by 3.543 in., which develops 45 hp at 3600 rpm. The frame tubes, which have an internal diameter of 2.95 in., are made use of for the circulation of the cooling water; no radiator being fitted. The Turbomatic transmission comprises two engine driven pumps which transmit fluid to two turbines — one for each rear wheel. The connections from pumps to turbines pass under the chassis. The fluid can be inverted by manual control. The claim made for the efficiency of this hydraulic transmission is 67 to 74 per cent. Each turbine housing is suspended to the chassis frame, and power from it is transmitted to a road wheel by an open double universally-jointed shaft.

The four wheels are independently sprung, most of the front and rear parts being interchangeable. Each wheel suspension incorporates a large-diameter hollow piston sliding within a cylinder which is mounted on the chassis frame. There is a coil spring within the cylinder, and the unit is attached to the frame by two short arms. Two adjustable valves put the cylinder in communication with the atmosphere, and brake the upward and downward movement of the piston by pressure or by vacuum. Hydraulic brakes are fitted, but disk brakes, it is stated, are

(*Turn to page* 120, *please*)

GEAR SHAVING NOW *Much Faster and More Flexible*

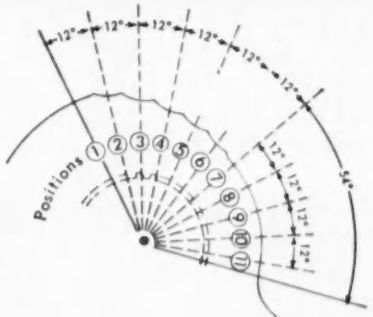


When Automatic Differential Up-feed and Conventional Crowning were added to the Red Ring Model GCU, shaving speed, flexibility and economy were all significantly increased.

AUTOMATIC DIFFERENTIAL UP-FEED

This efficient device provides for the first time an automatic cycle applicable to both diagonal and conventional shaving. This cycle is controlled by an eleven-position master cam. Included are backlash take-up, infeed cutting strokes, idling strokes and return to unloading backlash. The entire cycle or any portion of it may be used depending on job requirements.

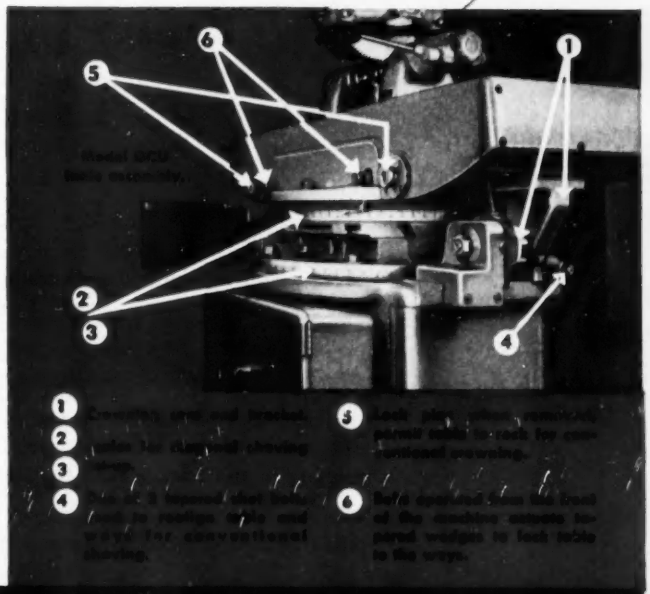
The cam itself does not actuate knee movement. It is strictly a stepped gaging device. Consequently every knee movement is positive, extremely precise and very fast. No danger of operator's errors. Perfect accessibility for fast loading and unloading.



One of the two control cams carried by the feed unit sequence plate.

CROWNING

Gears being shaved conventionally can be crowned by rocking the table about a central pivot during the automatic cycle. The cam controlling the rocking movement is located on table centerline to avoid any tendency to twist. This device also provides for taper shaving.



Write for Bulletin S53-7 for full details.

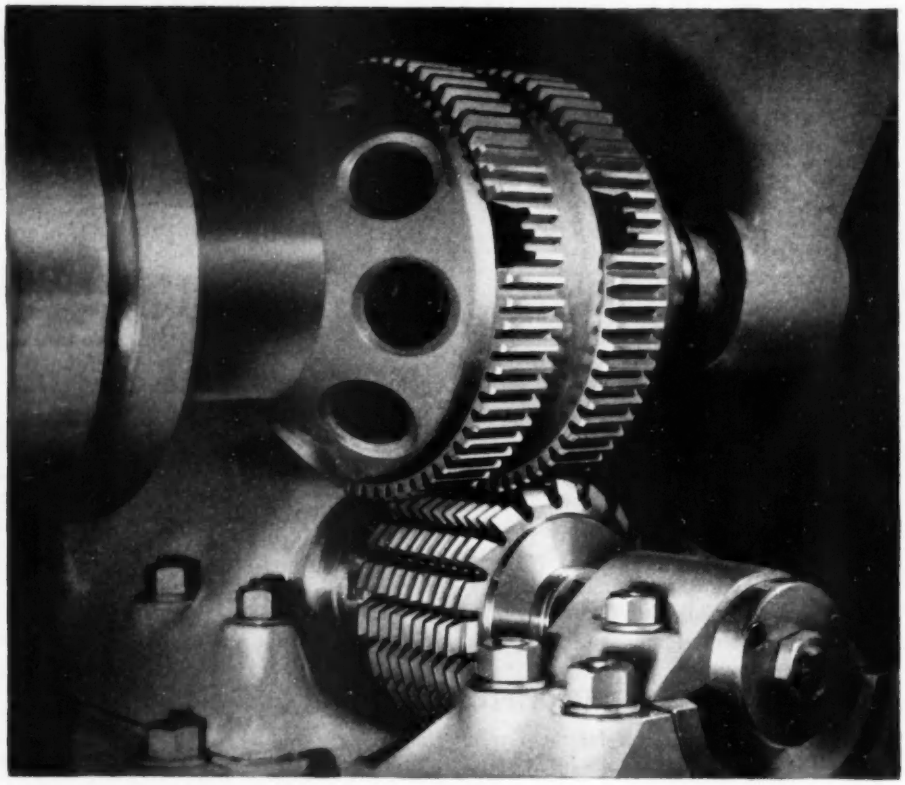


NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

6585

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



Hold .002" Over Pins, One-Cut Hobbing

ON NO. 14-15 MACHINE

Where heavy production and extreme accuracy are required, the No. 14-15 Hobbing Machine offers wide work range with extremely easy set-up and operation. Automatic cycling with infinite hydraulic feeds assures consistently high output.

On the job shown here, Caterpillar Tractor Co. is finish hobbing 8 pitch, 10" diameter clutch gears in 1-cut on a Barber-Colman No. 14-15 Hobbing Machine. Measurement over .250" pins is held consistently within .002."

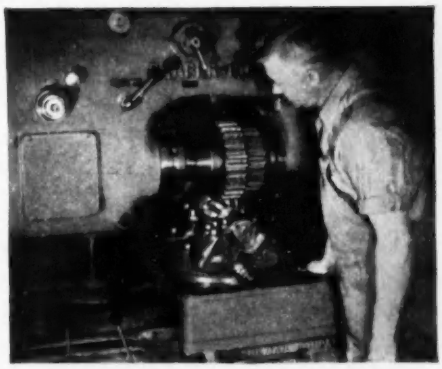
An important production feature of the machine is the built-in differential, standard equipment for convenience in hobbing helical gears. A large 18⅝" diameter worm gear running in anti-friction bearings also permits high speed precision indexing.

With capacity for one-cut hobbing of gears as coarse as 3½ pitch in steel, the No. 14-15 supplies rigidity and power to meet most any demands for high gear production and accuracy.

B U I L D E R S O F P R E C I S I O N G E A R

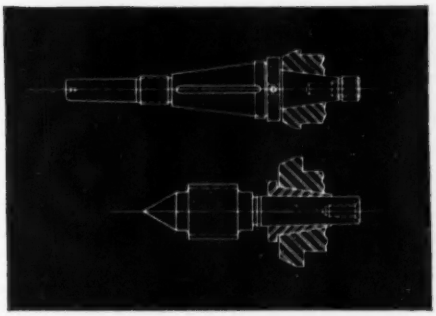
wide variety of work on no. 14-15 machines

In addition to these 8 pitch gears, a variety of high production gear jobs are handled on No. 14-15 machines in the manufacturing department at Caterpillar. The accuracy, versatility and production convenience of the machine make it ideal for heavy accurate gear cutting, typical of tractor production. Shown here is another job, a 3 pitch cluster gear with 10.333″ outside diameter, hobbed in two cuts to pre-shave limits, one per load, holding .006″ over .5760″ pins.



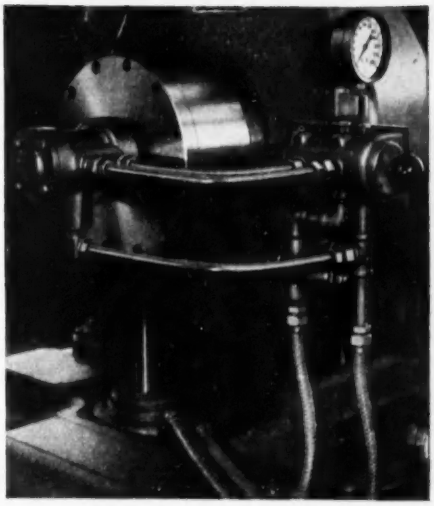
interchangeable hob spindle adds flexibility

The No. 14-15 has an interchangeable shank-type hob spindle as standard equipment. This enables the operator to interchange straight arbor, taper arbor or shank-type hobs to suit a variety of job conditions. Different diameter arbors may also be used. In cases where hob diameters are small and a shank hob is required, shanks may be inserted directly into the spindle.



hydraulic pressure available for tool clamping

Since the machine is an all-hydraulic machine, self-contained hydraulically actuated tooling for work holding is easily adapted. Hydraulically operated collets and chucks may be used as optional equipment when the machine is ordered with a hydraulic cylinder. Use of such equipment greatly reduces handling and loading time, and is particularly convenient where one operator is handling several machines. The hydraulic system of the machine has been constructed in such a way that this cylinder may be ordered and piped in after the machine has been in service.





Complete information on the No. 14-15 Hobbing Machine is available from your Barber-Colman representative; or send us part prints and production requirements, and we will gladly furnish estimates without obligation.

Write Us for a Copy of the New No. 14-15 Hobbing Machine Bulletin.

HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES

BARBER COLMAN

Barber-Colman Company

GENERAL OFFICES AND PLANT, 6311 ROCK STREET, ROCKFORD, ILLINOIS

HOBS AND MACHINES SINCE 1911

(*Continued from page* 116)

in preparation. No body was shown, but it was stated that this will be a four-door, six-passenger sedan in plastic panels on a steel frame. Complete car weight is stated to be 1870 lb. This car will not be in production for a year.

The Italian bodybuilder Touring has worked in conjunction with Pegaso to produce a "berlinette" in which the rear fin fenders are swept up to blend into the roof. Just to the rear of the door the fender is swept upwards until it flairs into the roof and a funnel is formed between it and the body. In the base of this tunnel there is aeration for the rear tires. In addition to reduced head resistance, as claimed after wind tunnel tests, this structure has a safety factor, for it provides triangular bracing adding considerable to the rigidity of the body and making it capable of withstanding tremendous impacts without caving in.

Canadian-U. S. Problems Discussed

(*Continued from page* 33)

in rod drop hammers, air-lift hammers, automatic upsetting machines and other equipment were reported.

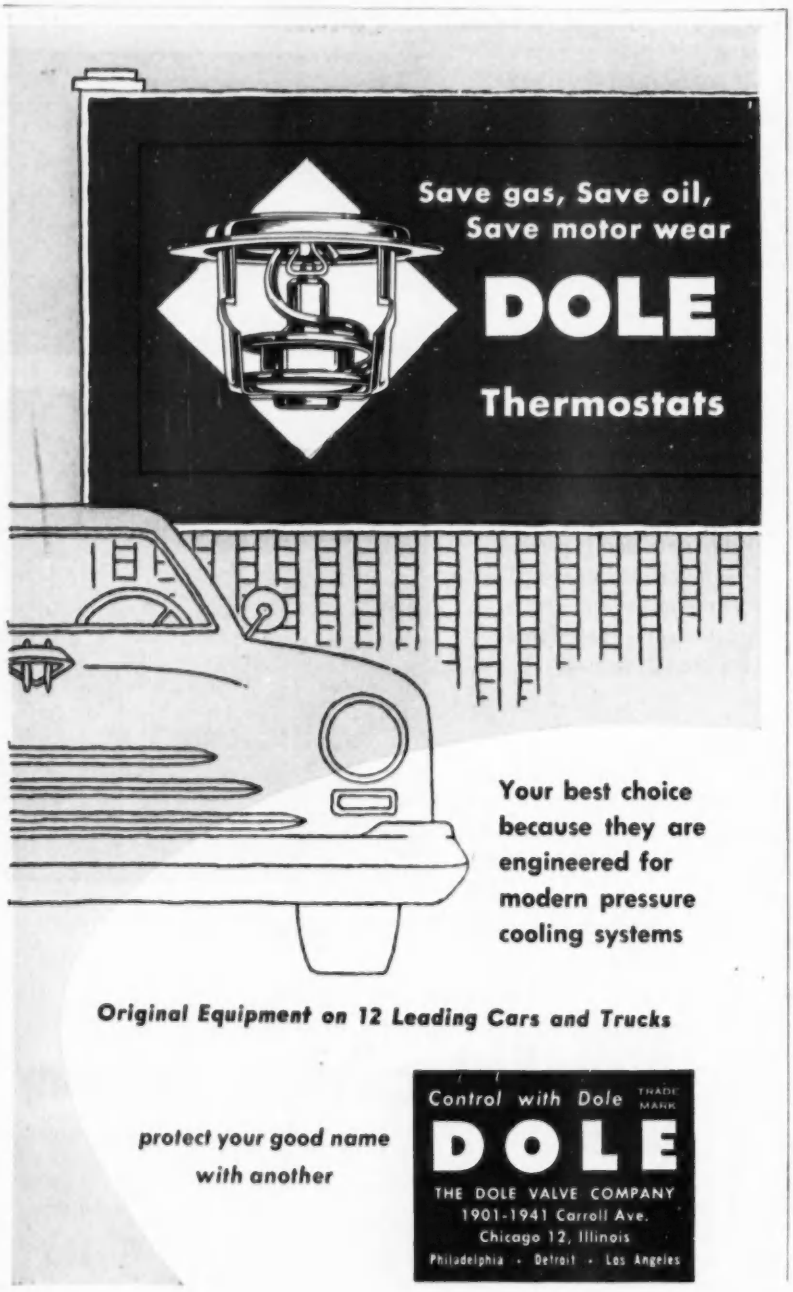
The panel on production tooling and shop methods dealt with tips breaking, dual purpose oil as a solution for leakage of oil in machines, crystals for metal cutting and low pressure jets for cooling purposes using both air and oil cooling methods. Multi-purpose and transfer machines were felt justified, with proper maintenance, even for Canadian production which is about one-tenth of U. S. production.

The session on production control and materials handling brought out opinion that different methods must be used by smaller and larger operators. Roller gravity conveyors were felt cheapest for Canadian plants. With a growing buyers' market it was the opinion of panel members that producers of material will have to take more risk and hold more inventory than to date where the end producer has done so. Canadian companies using fork trucks reported no formula for maintenance, while large users reported buying stocks of replacement parts and giving the equipment periodic overhauls.

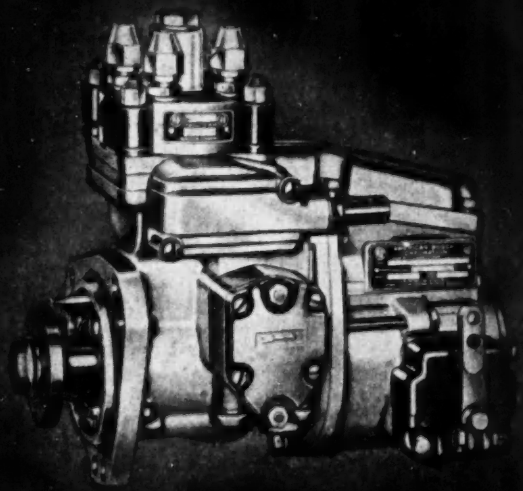
The panel on materials and heat treatment dealt with compressive stress patterns on rear axles for trucks. It showed a trend toward induction heating methods. The panel dealt with measuring case depths, resulphurized steels, distortion on carbonized work on gears, and use of boron.

A panel on selection and training of technical and supervisory personnel discussed what qualifications should be looked for in applicants for supervisory personnel. Promotion policies were discussed. Ability to get along with people was felt a requisite for selection of supervisors. It was pointed out that the engineering shortage in many companies was due to lack of job analysis, that technical assistants could handle some of the jobs now being done by engineers who could be freed to do more imaginative work.

How a Canadian aircraft factory goes about setting up a plan for airframe production was dealt with by Dean P. Stowell, assistant to the president, Canadair Ltd., Montreal. He stated in his paper that the plan included the factors of comprehensive-



greatest single advance in diesel fuel injection..



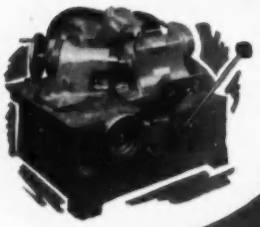
AMERICAN BOSCH

American Bosch single-plunger multi-cylinder pumps have literally revolutionized the concepts of diesel fuel injection.



PROFITS GO UP
COSTS GO DOWN
...with a complete Waterbury-Hall valve shop

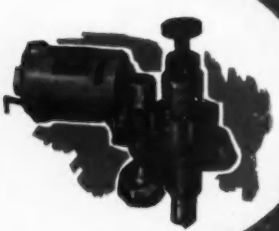
With wet-grinding, the Waterbury-Hall Model 80 Valve Refacer keeps the wheel free from loading . . . provides a better finish. And Model 80 grinds all angles to precision relationship with the valve stems.





The Waterbury-Hall EJ Eccentric Seat Grinder, with its point contact principle, gives a fast, clean, accurate job the first time. Yet it grinds 5 to 10 times more seats per wheel. Its patented Expanding Pilot finds the true center of a worn guide condition.

The Waterbury-Hall Model M Valve Seat Inserter counterbores the block, spins it in, if desired —its two expansion cutter heads take the place of 25-30 fixed-type cutters.



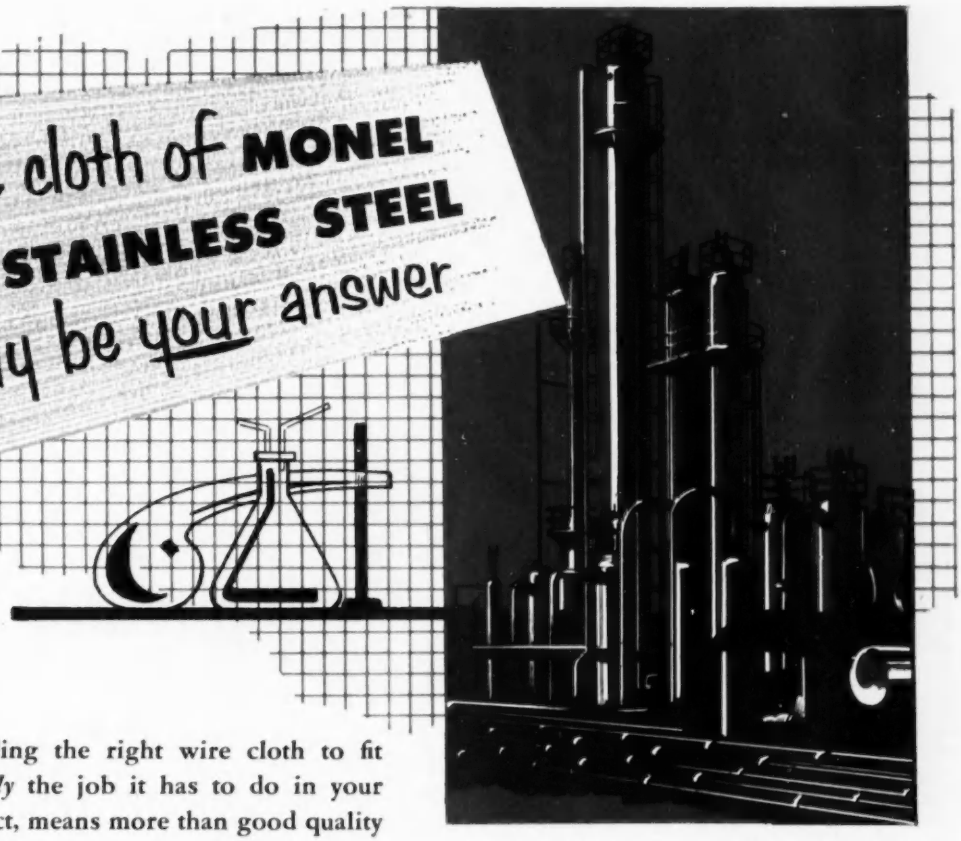
WATERBURY TOOL DIVISION
VICKERS, INCORPORATED
168 Aurora St., Waterbury, Connecticut

ness, flexibility, evolution and enlightened work climate. The plan "has for background direct manhour reductions, acceleration curves, production design and tooling, and a variety of miscellaneous statistics used as parameters of achievement and magnitude. It is framed in block considerations, preliminary detail considerations and final detail considerations, and is hung on the wall of every supervisor in every department involved in the program." (Canadair Ltd. makes Sabre F-86E fighters for Canada, Great Britain, NATO countries and the U. S.

The history of a jet aircraft engine industry in Canada was unfolded for the meeting by Val Cronstedt, director of engineering, Gas Turbine Division, A. V. Roe Canada Ltd., Toronto. In reporting the difficulties, he stated that of the 3200 part numbers in the Avro Orenda jet engine, only 200 are manufactured at A. V. Roe, the remainder at subcontractors, many of whom had to build new Canadian plants as subsidiaries of their U. S. and British counterparts. He pointed out the amount of machine tool work involved accounts for 240 tons of scrap disposal per month, of which 180 tons are at the engine plant and 60 tons at subcontractors. On the need for constant changes, he stated that about 3000 engineering changes have been made to date, involving 30,000 drawing changes, accounting for almost one change per part in the engine. The engineering department has increased from the 90 people who took over the Government turbo-research work in 1947 to about 1850 people today, while the working force at the engine plant now numbers about 5000. Seven of the 62 major subcontractors employ about 4000 people. Mr. Cronstedt dealt at some length with training programs, necessary because of the scarcity of qualified workers for all operations.

R. B. McIntyre, executive engineer, De Havilland Aircraft of Canada Ltd., Toronto, described with slides, production changes which had to be made in the firm's postwar Canadian-designed single-engined aircraft, Beaver and Otter, to sell them to a variety of world markets. The smaller Beaver is now produced to be used with wheel, ski, float or combination retractable ski and wheel landing gear. Production and design engineers made the necessary changes to enable it to be used to carry outside loads as canoes strapped onto pontoon struts and automotive equipment strapped under the wings. The plane is used for freighting, passenger service, and crop spraying in many countries.

wire cloth of **MONEL** or **STAINLESS STEEL** may be your answer



● Finding the right wire cloth to fit *precisely* the job it has to do in your product, means more than good quality and uniformity . . . more than the right type and size of wire, or mesh, or type of weave. It has to be right metallurgically and chemically . . . to prevent failures . . . to improve your product performance.

Reynolds stainless steel, or Monel metal cloth has a remarkable range of properties, in addition to resisting chemical and atmospheric corrosion. Stainless steel resists oxidation, and oxidizing solutions. It resists many acids; acid and alkaline salts; acetone, ethyl alcohol, benzene, chloroform, etc.

Stainless steel wire cloth as Reynolds makes it, is shock-resistant and non-magnetic, with good weldability . . . is strong enough to defy high temperatures and resist scaling; tough enough to take sub-zero temperatures to minus 320° F. *Consult Reynolds engineers.* No cost or obligation.

Reynolds WIRE CLOTH protects performance

REYNOLDS WIRE DIVISION, NATIONAL-STANDARD CO., **DIXON, ILLINOIS**

Divisions of National-Standard Co.

ATHENIA STEEL...*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD...*Niles, Mich.*	Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY...*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS...*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

NS NATIONAL-STANDARD Company NILES, MICHIGAN

Huge Crowds at Metal Show

(*Continued from page* 41)

trical discharges replace the physical contact between tool and work piece normal to conventional machining. The M-400 will machine round holes, either through or blind, and will machine irregular cavities through either soft or hard materials without any initial preparation or perforation of the piece to be cut. Also, three-dimensional cavities can be created in either hard or soft materials, including tungsten carbide. Where greater precision of location and dimensional accuracy are called for than can be provided by the basic mechanical equipment of the machine, the M-400 assembly can be readily applied to more precise equipment such as a jig grinder. Work is not affected in any way by heat of the arc. Some 99.9 per cent of the energy of the arc is confined to material removed from the work piece.

Completely automatic high production machines were featured by Standard Electrical Tool Co. The machines are offered in a variety of types and sizes and are built to customer's order and specifications.

Five metal developments were announced at the show by Carboloy Department of General Electric Co. Among them was the first in a new series of heavy duty steel-cutting carbides, Carboloy 370. The new grade is said to maintain its rigidity, eliminating cutting tip deformation, at temperatures as high as 1800 F. Carboloy grade 370 is composed of tungsten, titanium, tantalum and cobalt. It has a density of 12.60 and Rockwell hardness on the A scale of 91.0. Two grades of Hevimet, 50 per cent heavier than lead, have been developed for particular applications. One grade, HM-2, provides 1.5 more gamma ray protection than lead, and is specially adapted for radiation shielding. The other grade, HM-1, has high tensile strength and affords greater rotary stabilizing force in applications such as gyro rotors. A unique feature of the Carboloy exhibit was the use of television to bring a demonstration of grade 370 from the Warner and Swasey plant in Cleveland to closed-circuit television receivers in the booth at the show.

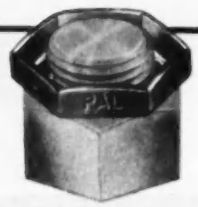
A new development by the Amplex Manufacturing Co. Division of Chrysler Corp. was displayed—Oilite stainless steel. This material was developed for use where even bronze and other materials failed because of corrosion. Three important applications are: bearings; finished machine parts, and permanent filters. Oil-cushioned Oilite stainless steel bearings are designed to give foolproof performance where highly corrosive factors are present. They are impregnated with oil to provide a lasting oil cushion. This built-in reservoir supplies bearing surfaces with a constant and continuous film of lubricant which insures against scoring and seizing. Finished machine parts also are available in Oilite stainless steel. These include not only parts which are difficult to machine, but also units of such design that they are impractical to machine. Oilite stainless steel permanent filters

(*Turn to page* 131, *please*)

HUDSON

assures safety of vital bolted assemblies *by adding REGULAR TYPE* PALNUT LOCK NUTS



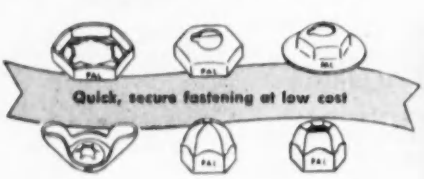


HUDSON uses Regular Type PALNUT Lock Nuts on front and rear shock absorber mountings (above), and connecting rods. Hudson also uses Adjusting Type PALNUTS on glove compartment lock, and Washer Type PALNUTS on deck lid lift handles. Below is the Hudson Jet-Liner four-door sedan for 1954 with new Flight-line styling.

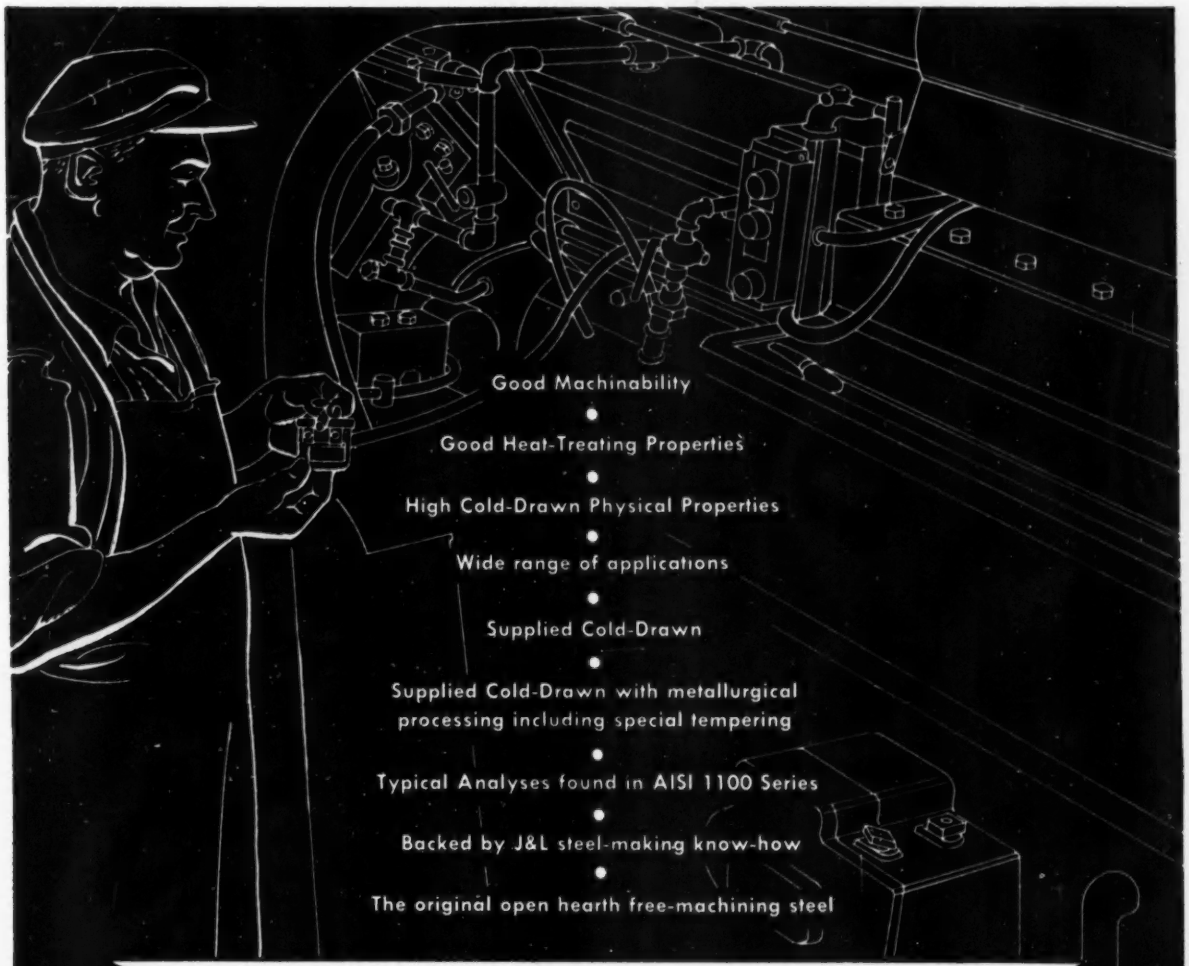


PALNUT Lock Nuts are used on practically every motor car and truck because they provide more advantages than any other locking method. They can not loosen under severest vibration. They cost very little—assemble fast with hand or power tools—require only three bolt threads—may be removed and re-used. Regular Type PALNUTS for heavy duty, and other types for light assemblies (see below), are used on dozens of automotive applications. Send for catalog showing complete line. Free samples on request.

The PALNUT Company
60 Cordier St., Irvington 11, N. J.
Detroit: 730 West Eight Mile Road



PALNUT
TRADEMARK
LOCK NUTS



Good Machinability

•

Good Heat-Treating Properties

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High Cold-Drawn Physical Properties

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Wide range of applications

•

Supplied Cold-Drawn

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Supplied Cold-Drawn with metallurgical processing including special tempering

•

Typical Analyses found in AISI 1100 Series

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Backed by J&L steel-making know-how

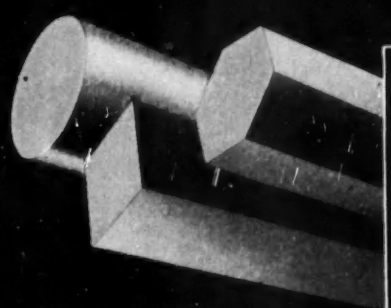
•

The original open hearth free-machining steel

Let's get down to the **point**

You can make **better parts** with **J&L** Jalcase Cold Finished Steel

You can take advantage of Jalcase properties to produce better parts, faster, cheaper. Contact the J&L representative nearest you.



J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH



9-Stage progressive dies are used to blank, form, pierce and trim. Feeding and scrap cutting (scrap delivered to tub at side of press) is fully automatic. Piece parts are blown by air up rear delivery chute and onto conveyor for delivery.

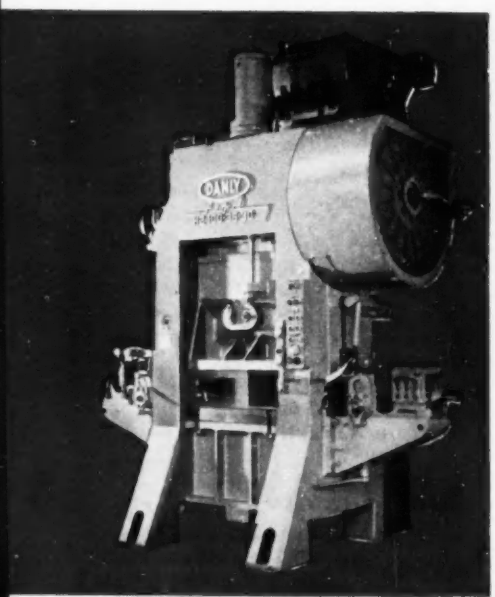
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MECHANICAL PRESSES...50 TO 3000 TONS
HYDRAULIC METALWORKING EQUIPMENT

How can you get

high operating efficiency

on high production jobs?



Longer die life . . . continuous high-speed operation of the Danly Autofeed Press makes the die investment pay off in production efficiency... precision press features assure added alignment accuracy and greatly lengthened die life.

A Leading Automotive Parts Manufacturer DID IT on their

DANLY PRESS

Selecting the right press for an intricate die set-up was a difficult problem facing a leading producer of automotive parts. Needed was a *high production* press built for rigidity and precision to extend the life of costly 9-stage progressive dies and improve piece part quality.

What press was specified? A Danly 100-ton Autofeed Press *more than met every requirement* with a remarkably high record of *operating efficiency!* Running full automatic almost continuously through 2 shifts daily, this Danly stamps automobile thermostat valve seats at a rate of 125 strokes per minute. Since installation no major maintenance has been required ...cutting "down-time" losses, permitting steady, uninterrupted production.

Danly Presses have solved this problem for leading stamping shops across the country . . . and can do the same for *you*. Write for free Danly Autofeed Press Booklet and get the details.

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2100 South Laramie Avenue, Chicago 50, Illinois

PROVED AGAIN... *It costs less to run a DANLY PRESS!*



Single Action Straight Side



Autofeed



Underdrive Single, Double, Triple Action



Gap Frame



Double Action Straight Side

The RIGHT SELECTION pays off in Grinding Wheels too!





SIMONDS ABRASIVE CO.

Grinding Wheels

In buying wheels . . . as in hiring men . . . intelligent selection pays off in production. Simonds offers you productive grinding wheel selection in three ways: (1) through our free data book with wheel specifications for all your grinding jobs . . . plus information on Simonds complete line, including grinding wheels, mounted wheels and points, segments, polishing grain: (2) through Simonds field engineering service, ready at any time to help you get wheels for your specialized jobs: (3) through your Simonds distributor—constantly abreast of the latest developments in industrial grinding,and equipped to supply you promptly with Simonds wheels for superior results.

Write for data book and name of your Simonds distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON.

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Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y. Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que

New Products

For additional information please use postage-free reply card on page 73

(*Continued from page* 72)

Truck Tire

Recently announced is an all-nylon truck tire that reportedly has delivered over 100,000 miles in many types of service. Specially designed for the drive wheels of trucks and tractors, the tire is said to have a flatter, thicker tread that is cool-running to prevent cracking.

Layers of nylon cords beneath the tread rubber stretch together under impact to protect the tire body from punishing road shock and damaging bruises. It is available in sizes ranging from 8.25:20, 10 ply to 11.00:22, 12 ply. *The B. F. Goodrich Co.*

Circle 43 on page 73 for more data

Bearing Packer

Recently announced is a heavy-duty bearing packer that is said to operate in original grease containers. Called Presto-Paks, the unit is designed to handle all bearings from ¾ in. ID to 7½ in. OD (small end.)

A pressure screw tightens fast by finger pressure to hold the bearing in place. A hand-operated pump supplies a large volume of grease, flushes out dirt and provides even grease pressure throughout the bearing, according to the maker. The follow plate reportedly assures constant grease supply. *Gray Co., Inc.*

Circle 44 on page 73 for more data

Sealing Device

Recently announced is a sealing device for the sealing of bolts and studs at either high or low pressure, gas, liquids, or air. Series 600 has been designed especially for aircraft use.

Called Stat-O-Seal, the unit uses the principle of controlled confinement of the sealing gland. It is one-piece construction and nondirectional.

The O-Ring sealing gland in the device is mechanically fastened to the metal retainer. This is said to eliminate the possibility of failure of a chemical bonding agent. *Franklin C. Wolfe Co.*

Circle 45 on page 73 for more data

nothing can match the genuine . . .



FURS BY FREDRICA

Designing, Developing, Engineering, Manufacturing and Service

Spicer

Man aspires . . . nature transpires. The standards of excellence achieved in nature's masterpieces cannot be duplicated by the hand of man. Yet man . . . each in his own field . . . achieves his own incomparable measure of success. Through pioneering, research and progress in the field of automotive power transmission, Spicer has during the past 50 years established an enviable reputation as the

Leader in the Industry.



nothing can match the genuine . . .

The great preference for Spicer Universal Joints and Propeller Shafts is the result of many exclusive advantages, both in manufacturing experience and design.

Spicer revolutionized automotive power transmission in 1904 with the invention of the first practical universal joint.

Spicer developed the telescoping action so necessary in propeller shaft action.

Spicer developed the flange yoke and companion flange idea.

Spicer developed the outer casing of universal joints for better lubrication and protection.

Spicer introduced spring retainers that automatically compensate for packing wear.

Spicer pioneered the tubular shaft which enabled large diameters to be used with light weight.

Spicer developed the I-G type joint to seal in lubricant.

Spicer perfected cageless roller bearings, giving the Spicer Universal Joint far greater load capacity at higher speeds with less friction than any other type of similar product.

Nothing can match the genuine!

SPICER MANUFACTURING DIVISION
of Dana Corporation • Toledo 1, Ohio

49 YEARS OF Spicer SERVICE

ENGINEERING DANA MANUFACTURING

TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • WELDED TUBING

Huge Crowds at Metal Show

(*Continued from page* 124)

are said to be extremely efficient for filtering, separating, diffusing, and regulating the flow of a wide variety of liquids and gases. Size, shape, porosity and permeability can be varied to meet specific needs.

The Texas Co. displayed a cutaway model of a Merc-O-Matic automatic transmission to illustrate the numerous parts in a device of this kind which require machining and in most cases demand the use of suitable cutting oils.

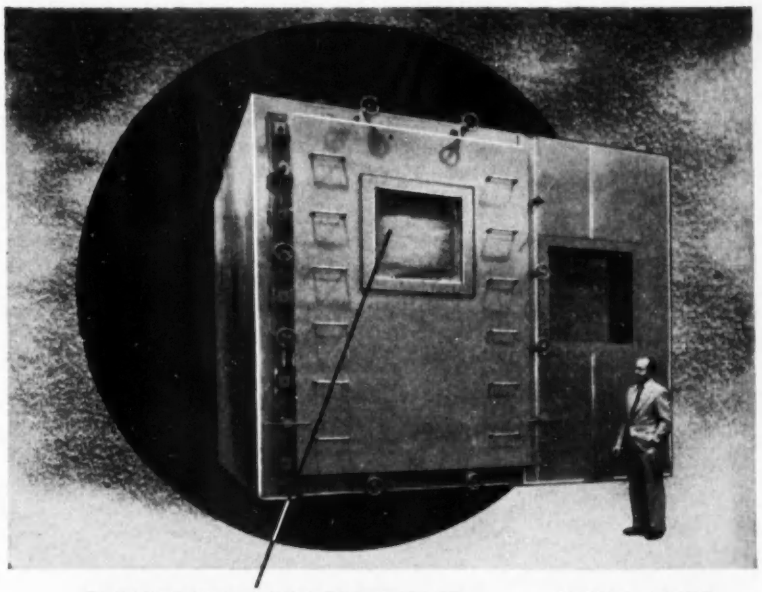
Grav-I-Flo Corp. showed its newest tumbling equipment. The larger capacity machines feature 31 to 89 per cent more work-load capacity in the same floor space. Improved cutting materials are said to shorten the cutting cycle by 15 to 25 per cent. Grav-i-Flo 66, 48, and 36 in. machines have cam locked doors with manually-released safety stops; and are available with unlined or rubber lined cylinders. Constant or variable speed drives are available, and timers from five minutes to 20 hour cycles. The machines are equipped with electric wiring and water piping installed, ready for plant hook-up.

New developments at the DoAll booth included band sawing, grinding and measuring equipment. Some of the machines and devices were brand new, and details will not be available until early next year.

Kurt Orban Co., Inc., demonstrated the latest Trebel balancing equipment. These versatile machine measure directly in the planes of compensation by means of the Trebel measuring beam. Measuring in both planes of compensation is done in one single run without stopping the machine or reversing the test piece. The test is said to require only about 20 to 40 seconds.

Udylite Corp. had in operation a working setup of a full automatic straight line plating machine for bumper bars. Design of the equipment allows use of anode arrangements for parts of complicated shape. A machine of this type is being readied for a large manufacturer of passenger cars.

A recently-developed radiant tube, gas powered shaker hearth furnace was shown by Westinghouse Electric Corp. The furnace has a maximum operating temperature of 1700 F, and is designed for heat treating small, light-weight parts of medium carbon, high carbon, and alloy steels without



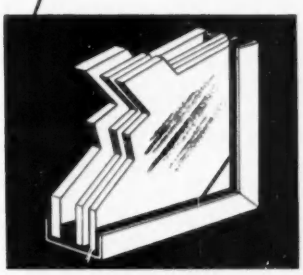
BOWSER ENGINEERED . . . YOU SEE

Frosting of windows is no problem in a Bowser Low Temperature Test Chamber. Special Nesa glass, with its electrically conductive surface, insures clear vision of items under test. This is just one of the many "extras" that Bowser has engineered into its test chambers . . . another reason why—for all your needs in environmental test equipment—your best bet is Bowser, the pioneer.

Performance characteristics of this Bowser chamber include:

- Temperature range from −100°F to 185°F.
- Altitude simulation up to 85,000 feet.
- Evacuation rate of 5000 F.P.M.

With outside dimensions of 13' 2" wide x 11' 2" high x 16' 6" long, this standard model chamber has an interior working area of 10' x 10' x 8' high. Door is 5' wide x 8' high, its window 30" x 30", and wall window 36" x 36".



NESA GLASS

Nesa Coated Glass used in Bowser Low Temperature Chambers has an electrically conductive surface that can be heated . . . preventing icing, frosting or fogging of observation windows.

BTR

BOWSER TECHNICAL REFRIGERATION

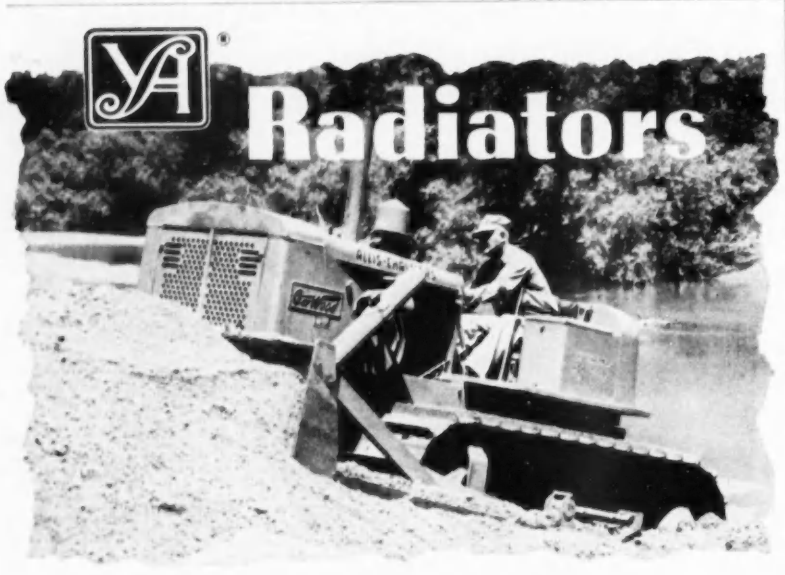
DIVISION BOWSER INC TERRYVILLE CONNECTICUT

scale or decarburization in an Endogas atmosphere. In operating, work is loaded on the hearth at the front of the furnace and the reciprocal motion of the shaker charger conveys the parts through the heating chamber until they fall off the discharge end of the hearth into the quenching fluid. The parts are then automatically conveyed from the quench tank on a mesh belt and discharged into tote baskets. The estimated production for this furnace at 1600 F operating temperature, is 400 to 600 lb per hr. The speed of the work through the furnace is adjusted by varying the operating ratio of the speed reducer which, in turn, varies the frequency of oscillation of the hearth.

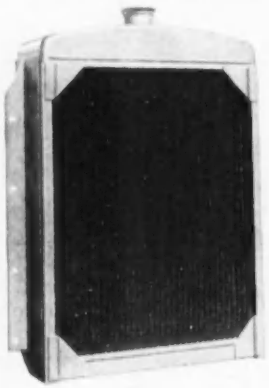
A new type ferrochromium to be marketed under the trade name EXLO was introduced by Vanadium Corp. of America. This new alloy, made by a unique, exclusive process, is produced at Vanadium Corporation's recently completed plant at Graham, West Virginia. It is produced in two grades, 0.025 per cent C and 0.06 per cent C maximum. It features high density, low silicon content, exceptional cleanliness and a high chromium to carbon ratio. It also has the advantage of being available in a wide range of sizes. Vanadium Corp. also featured several other new developments. These were SILBLOK 25 and 50 which are new, blocking grades of ferrosilicon with nominal silicon contents of 25 per cent and 50 per cent respectively.

The Lincoln Electric Co. demonstrated a new electrode which it claims is a new approach to electrode design, representing a step forward in electrode development. The new electrode, called Jetweld, incorporates powdered metal into the electrode coating. This new type of coating is said to use the heat of the arc more efficiently.

Jetweld is a heavily coated shielded-arc type of electrode for operation in flat or near flat positions with a-c or d-c welding current. It meets the physical requirements of class E-7016 and is used on work formerly calling for E-6012 and E-6020 electrodes on single pass or multiple pass welds. It is especially well suited for horizontal and flat position fillets, horizontal and flat position laps, single and multiple pass butts, deep grooves and corners, cover pass on multiple pass butts.



. . . built rugged for rough going . . .



Where the going is rough and the job is tough, that's where you will find a quality YA Radiator on the job meeting the demands for efficient cooling. YA Radiators can take it. Illustrated is a crawler tractor feeding sand to a dragline from a river sand pit. The tractor is equipped with a YA Radiator that will stand up under the vibrations and stress of crawler tractor operation where load factor is very high. YA Radiators are used on this type of construction machinery the world over. Perhaps the equipment you manufacture calls for this type of radiator equipment . . a letter from you will bring complete information on YA radiators.

Write Yates-American, Beloit, Wis., U.S.A.

California Representative E. E. Richter & Son, Emeryville, California

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BOOKS . . .

COOLING SYSTEM MANUAL, *published by E. I. duPont de Nemours & Co., Inc., 2504 Nemours Bldg., Wilmington 98, Del. Price, $2.00.* Prepared by anti-freeze experts, the manual tells how the cooling system works; gives the method for selecting proper coolants; shows how to chemically and mechanically clean the system; how to prepare the cooling system for winter and summer driving, and how to find and correct trouble spots. Specific instructions on how to correct each fault also are listed as well as suggested service charges.

BUSINESS FINANCE HANDBOOK, *edited by Lillian Doris, published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. Price, $10.* This authoritative 928-page handbook provides information on: starting, continuing, expanding, merging or reviving a declining business; ways to deal with both long-range and day-to-day problems; ways to secure and control working capital, manage profits, make short-term or long-term loans, distribute dividends, capitalize, recapitalize, avoid mortality hazards, buy a going business, control inventory investment, investigate credit, make collections; and the recognition of the tax aspect of any finance move. Step-by-step instructions help the reader handle every conceivable business finance problem. Answers are given in full detail with explanatory text, charts, and examples.

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Globe-Union batteries are creatively engineered for original equipment manufacturers. (As well as numerous private brands.) They are also produced for mass merchandising under the name GLOBE "Spinning Power".

For low freight costs and fast service, there's a Globe-Union factory located near your major markets (see below). And, to provide better service to the great Southwest, we've added a new plant at Houston, Tex.

GLOBE-UNION INC.

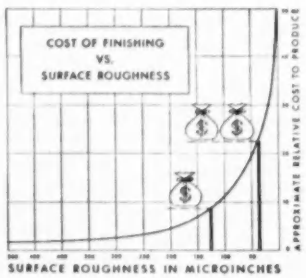
MILWAUKEE 1, WISCONSIN

GLOBE-BUILT — IT'S RIGHT FROM THE START!

Battery plants at: MILWAUKEE, WIS. • ATLANTA, GA. • BOSTON, MASS. • CINCINNATI, OHIO • DALLAS, TEXAS • HOUSTON, TEXAS • EMPORIA, KANSAS • HASTINGS-ON-HUDSON, N. Y. • LOS ANGELES, CALIF. • MEMPHIS, TENN. • MINERAL RIDGE, OHIO • OREGON CITY, ORE. • PHILADELPHIA, PA. • REIDSVILLE, N. C.

Surface finish control can reduce *your* machining costs

PROPER surface finish control may well yield big savings in your plant by reducing production costs, increasing production rates, and improving product performance.



The chart shows how finishing affects the cost of machined parts. For example, if the surface finish is specified as 125 microinches and you are overfinishing to 32 microinches because of lack of proper gaging equipment, your finishing cost can be twice as much as necessary. To eliminate costly overfinishing, actual checks of machined surfaces should be made in the shop to be sure that specified values are met *but not exceeded.*

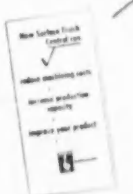
With surface finish control you can eliminate unnecessary operations and operate more efficiently. It helps you improve your products, since surface finish affects many factors in performance, such as break-in time, wear, heat transfer, lubrication, etc.

A new method of Surface Finish Control



THERE is now a simple method of measuring surface roughness on the production line so that the benefits of surface finish control can be realized. The Brush SURFINDICATOR* is a portable inspection tool . . . easy-to-use . . . accurate. This new instrument makes surface roughness measurement a practical shop operation.

*Trade Mark



Get the complete story—get your copy of this new booklet on Surface Finish Control. It offers you the key to reduced machining costs, more efficient use of equipment, and improved products. Write Brush Electronics Company, Dept. DD-11, 3405 Perkins Avenue, Cleveland 14, Ohio.

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INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
ULTRASONIC EQUIPMENT

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formerly
The Brush Development Co.
Brush Electronics Company
is an operating unit of
Clevite Corporation.

The Business Pulse

(*Continued from page* 78)

cies. Since the end of the first quarter of the year, there has been a fairly persistent, though moderate, decline in the number of production workers in durable-goods establishments, and beginning somewhat later, a corresponding gradual rise in the number of workers turning out nondurables. Similarly, the latest information on the receipt of new orders by manufacturers reveals considerably better experience in nondurable- than in durable-goods industries.

Fewer Weekly Hours per Worker

Until very recently the same divergence showed up in the reports of the Bureau of Labor Statistics on average weekly hours in manufacturing establishments. Average weekly hours per worker have shown a tendency to decline since the early part of the year in both durable and nondurable-goods industries, but more noticeably in the former. In the latest report, however, that for September, hours in nondurable-goods industries suffered a very pronounced decline, exceeding the drop in durables. But this probably does not indicate a sharper retrenchment of output in that month in the nondurables sector, inasmuch as the number of production workers in nondurables actually rose, while the number in durables declined. It may indicate, rather, that producers in nondurables are making more strenuous efforts to cut costs by reducing overtime payments. The general tendency for the average work week to decline — evident since the early months of the year — has been considered especially significant by some analysts because of the fact that in the relatively recent past this series has tended to lead over-all business activity on the downturn. It did so in the cyclical movement of 1937-38 and in the inventory recession of 1949.

Bank Loan Expansion Lags

Further confirmation that business is in a phase of downward adjustment is seen in the recent trend of bank loans. From midyear through early October, the cumulative growth in commercial, industrial and agricultural loans was considerably smaller than the seasonal expansion in the like period of 1952. Indeed, the expansion this year has lagged behind

(*Turn to page* 136, *please*)



"U. S." Research perfects it...

"U. S." Production builds it

In the great laboratory in the United States Rubber Company plant at Fort Wayne, scientists and engineers are working on problems involving rubber-to-metal parts and plastic parts for the automotive industry. They have at their command one of the most modern and extensive laboratories in existence – equipped with all the latest research and development facilities. "U.S." RESEARCH PERFECTS IT.

And then in the great Fort Wayne plant itself, ideally located for "on-the-doorstep" service to the automotive industry, skilled men produce the rubber-to-metal parts and precision molded rubber and plastic parts, and precision extrusions that make equipment last longer, ride more comfortably, more economically.

"U.S." sales engineers are right on your doorstep—at New Center Bldg., 7430 Second Ave., Detroit 2. They are your contact with the Fort Wayne laboratory and plant. And remember, the "U.S." experts have solved many and many a problem when all others had given up. For full information, write to address below.

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"U.S." Research perfects it
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UNITED STATES RUBBER COMPANY

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The Business Pulse

(*Continued from page* 134)

that of every postwar year from 1947 on, with the single exception of 1949, which was a year of economic recession.

Behind the decline in aggregate activity have been rather well-defined "adjustments" in particular industries. Steel and automobiles have been in the forefront in this respect for some months, and to a lesser extent home building also. Very recently, another major industry — petroleum —has embarked on a retrenchment program designed to reduce heavy inventories and bring output into line with demand.

Improved Demand for Steel

In the case of steel, sentiment seems to have improved in recent weeks. In the early part of September, it will be remembered, the steel ingot output rate dropped just below 90 per cent of theoretical capacity for a brief period, evoking expressions of concern from some quarters. However, recently output has been holding pretty steadily in the neighborhood of 95 per cent of capacity, and this better performance, together with some evidence of improved demand, has dispelled much of the earlier pessimism. Some observers are now predicting that the output rate will hold close to present levels well into the first quarter of next year.

In automobiles, dealers continue to protest that "overproduction" is diminishing their profit margins, and there have been many predictions of high dealer mortality as a result. Producers themselves recognize that the market is not as strong as it was earlier, and there seems to be wide agreement that a smaller number of cars will be sold in 1954 than in the present year. An average of estimates for 1954 indicates a decline in the output of automobiles of about 10 per cent. Even at this level, however, producers expect to avoid serious hardship, noting that 1954 would still be the third best year in automotive history.

New construction expenditures have been tending lower on a seasonally adjusted basis since the early months of the year, although they remain high in dollar terms. Featuring the downward tendency in this sector has been a drop in new housing starts. In February, such starts were at a seasonally adjusted annual rate of 1,213,000, whereas by September the annual rate had fallen to about 964,000. While total starts in 1953 will exceed a million units, it is clear that they will not match the annual total of 1,127,000 for 1952.

Crude Oil Output Cut Back

In early September, producers of crude oil began to cut back on output in an attempt to correct excessive inventories of both crude oil and gasoline. Daily average production, which amounted to 6.53 million barrels in the week of August 29, dropped off steadily through September and by the week of October 17 was down to 6.20 million barrels. Stocks have not yet fully reflected the cutbacks, however, and further reductions are a distinct possibility. The problem of adjustment is complicated by the fact that imports of both crude oil and oil products have been running at high levels.

The price picture is not clear just at present. Agricultural commodities, which have been under pressure for a long period, appear to have firmed following the defeat of the Republican

(*Turn to page* 140, *please*)

Burton SPRINGS
MEANS BUSINESS





Your business depends upon your ability to deliver the goods. By equipping your motor transport vehicles with Burton Leaf Springs, you assure your load the maximum amount of security on the road.

Burton Springs are manufactured to the most rigid standards to give unexcelled performance under all conditions. When your equipment is hauling heavy goods under contract, you'll know that load is safe riding on Burton Springs.

Our engineering experience and skill have found wide acceptance throughout the motor transport industry. Studebaker, as well as many other notable manufacturers, use Burton Springs as original equipment.

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ENGINE BUILDERS:

CUT THE COST OF chrome plated oil rings IN HALF!

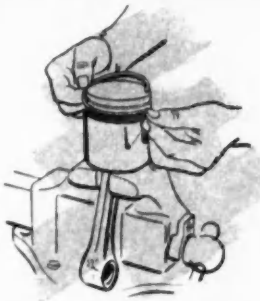


This new Muskegon CSR-200 is a brand new multiple piece ring that combines the advantages of chrome plating and Unitizing, at a remarkable price—half the cost of chrome plated cast iron oil rings.

By chrome plating the rails, Muskegon brings you a ring that virtually eliminates scuffing, reduces engine rejects, increases oil economy and reduces ring wear, bore wear and blowby. And by applying the patented "Unitizing" process, Muskegon delivers the multiple pieces connected together with special adhesive which dissolves completely during the first engine run, leaving the pieces suspended and free to conform to cylinder contours. Use it on your assembly line like a one-piece ring.

Test these unbreakable, all-steel CSR-200 rings on your own engines in your own laboratories. See for yourself the extra efficiency and economy they provide. Write us, today.

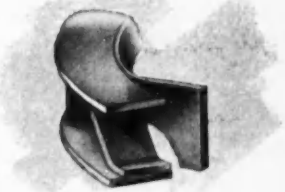




Multiple pieces handle like a one-piece ring. Rails and spacer are correctly assembled and "Unitized" with adhesive cement.



Adhesive disappears during first engine run. Pieces separate to conform to cylinder contours.



Heavy duty expander assures perfect fit. Tight seal conserves oil, increases engine efficiency.



MUSKEGON Piston Rings

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MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

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Presses, Shears, Brakes and

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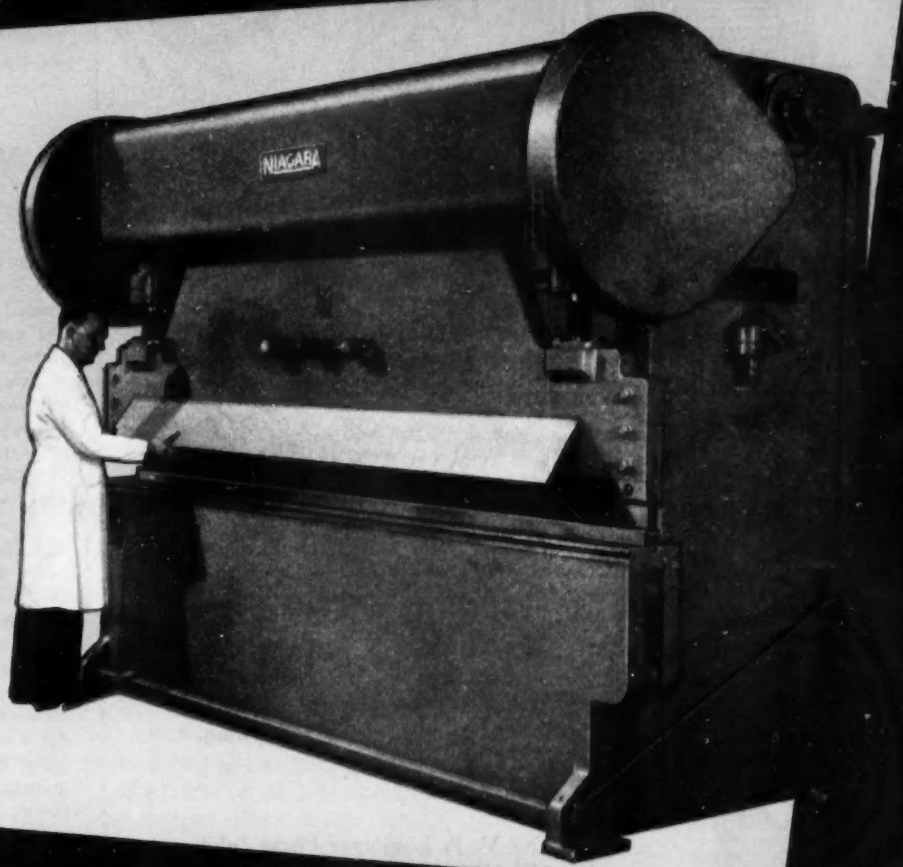
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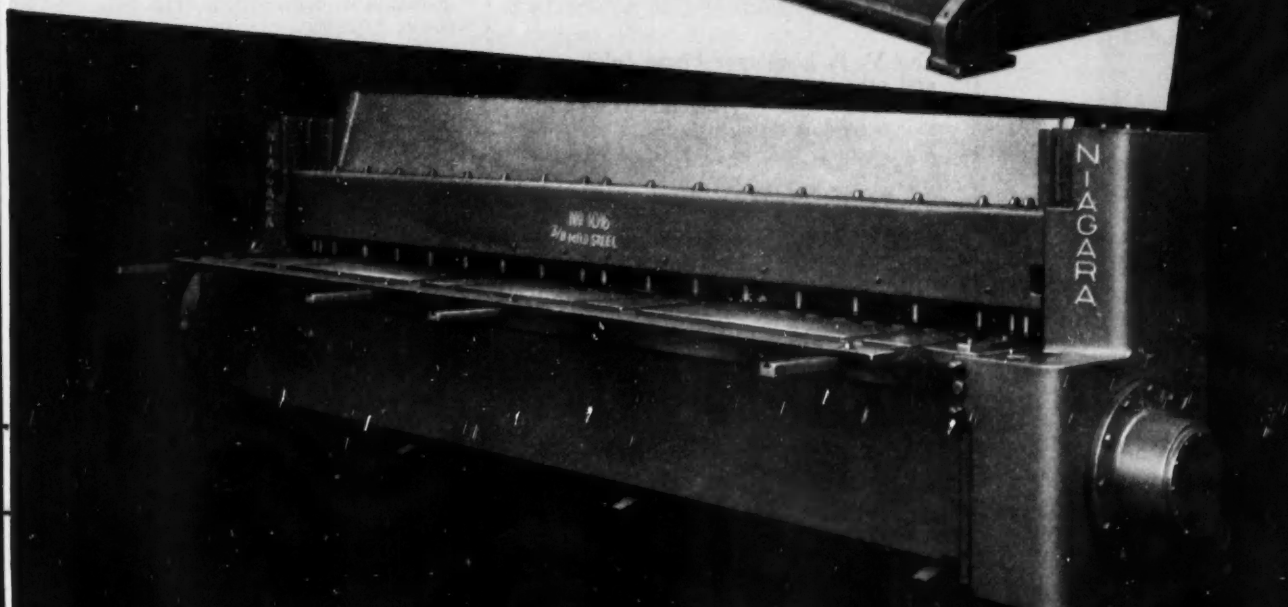
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Use Sturdy

CLEVELAND CONTAINERS

for Packaging

IMPORTANT PARTS!

Our Metal End Telescope Cans and Curled and Disc End Containers are ideal for welding rods . . . cutting tools, such as drills and reamers . . . also gauges and other instruments.

They save time in packing many kinds and quantities of items ready for assembly, even to small items such as bearings and other parts requiring frequent replacement.

★ ★ ★

Excellent, too, for long-time storage and shipping.

★ ★ ★

Our V. P. I. (Vapor Phase Inhibitor) and other new type liners are available, affording years of protection from rust and corrosion without the need of coating products with oil, grease or wax.

Ask about Cleveland Containers with special liners.

Our wide experience is at your command.

For the best . . . Call CLEVELAND!



The CLEVELAND CONTAINER Co.

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• Spirally Wound Tubes and Cores for all Purposes

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Cleveland Container Canada, Ltd.: PLANTS AND SALES OFFICES: Toronto and Prescott, Ont. • SALES OFFICE: Montreal.

The Business Pulse

(*Continued from page* 136)

candidate in the special Congressional election in Wisconsin. The belief has grown that this defeat has increased the likelihood of continuation of the present program of high and rigid agricultural supports. Prices of many industrial commodities, however, have continued soft, reflecting the better supply situation.

1953 Vehicle Registrations

(*Continued from page* 32)

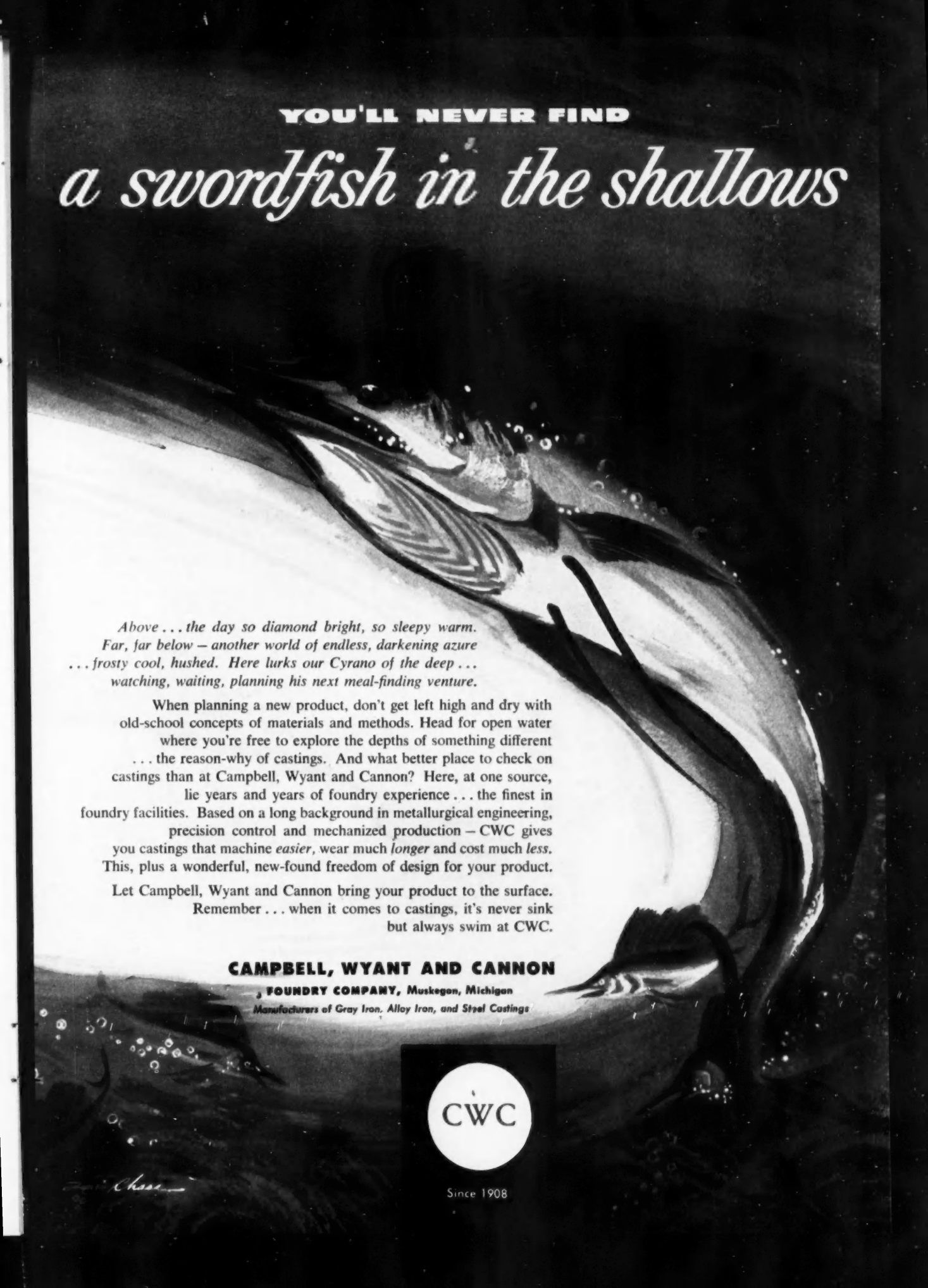
The preliminary registration figures are based on the annual survey conducted by AUTOMOTIVE INDUSTRIES for the purpose of establishing a sound estimate of what may be expected in the way of registrations for our present registration year. All of the motor vehicle commissioners of the various states cooperated with us by furnishing actual returns to date, in most cases September 1, and also their estimate for the remainder of their fiscal year.

On the basis of these preliminary returns California will have well over five million registrations with New York coming in second with about four million cars, trucks and buses registered. Nineteen states in all will have over one million registrations as against 18 states in 1952, the added state being Washington, which has increased its registrations from 967,000 to 1,016,000.

The marked increase in the U. S. registrations is due to the very high rate of production that has been maintained throughout 1953 and the resulting new car and new truck sales. New registrations of passenger cars for the first nine months of 1953 are up about 45 per cent over the similar period of 1952, accounting for 4,370,044 cars as compared with 3,014,847. New truck registrations through September are 706,606 as compared with 594,233, an increase of about 19 per cent.

There will be an increase in scrappage during 1953 and present indications are that about 4,103,000 cars, trucks and buses will have gone out of service during the year while only 3,482,000 were scrapped during 1952.

AUTOMOTIVE INDUSTRIES
Keeps You Informed


YOU'LL NEVER FIND
a swordfish in the shallows
Above . . . the day so diamond bright, so sleepy warm.
Far, far below – another world of endless, darkening azure
. . . frosty cool, hushed. Here lurks our Cyrano of the deep . . .
watching, waiting, planning his next meal-finding venture.
When planning a new product, don't get left high and dry with old-school concepts of materials and methods. Head for open water where you're free to explore the depths of something different . . . the reason-why of castings. And what better place to check on castings than at Campbell, Wyant and Cannon? Here, at one source, lie years and years of foundry experience . . . the finest in foundry facilities. Based on a long background in metallurgical engineering, precision control and mechanized production – CWC gives you castings that machine easier, wear much longer and cost much less. This, plus a wonderful, new-found freedom of design for your product.
Let Campbell, Wyant and Cannon bring your product to the surface. Remember . . . when it comes to castings, it's never sink but always swim at CWC.
CAMPBELL, WYANT AND CANNON
FOUNDRY COMPANY, Muskegon, Michigan
Manufacturers of Gray Iron, Alloy Iron, and Steel Castings
CWC
Since 1908

AIRBRIEFS

(*Continued from page* 82)

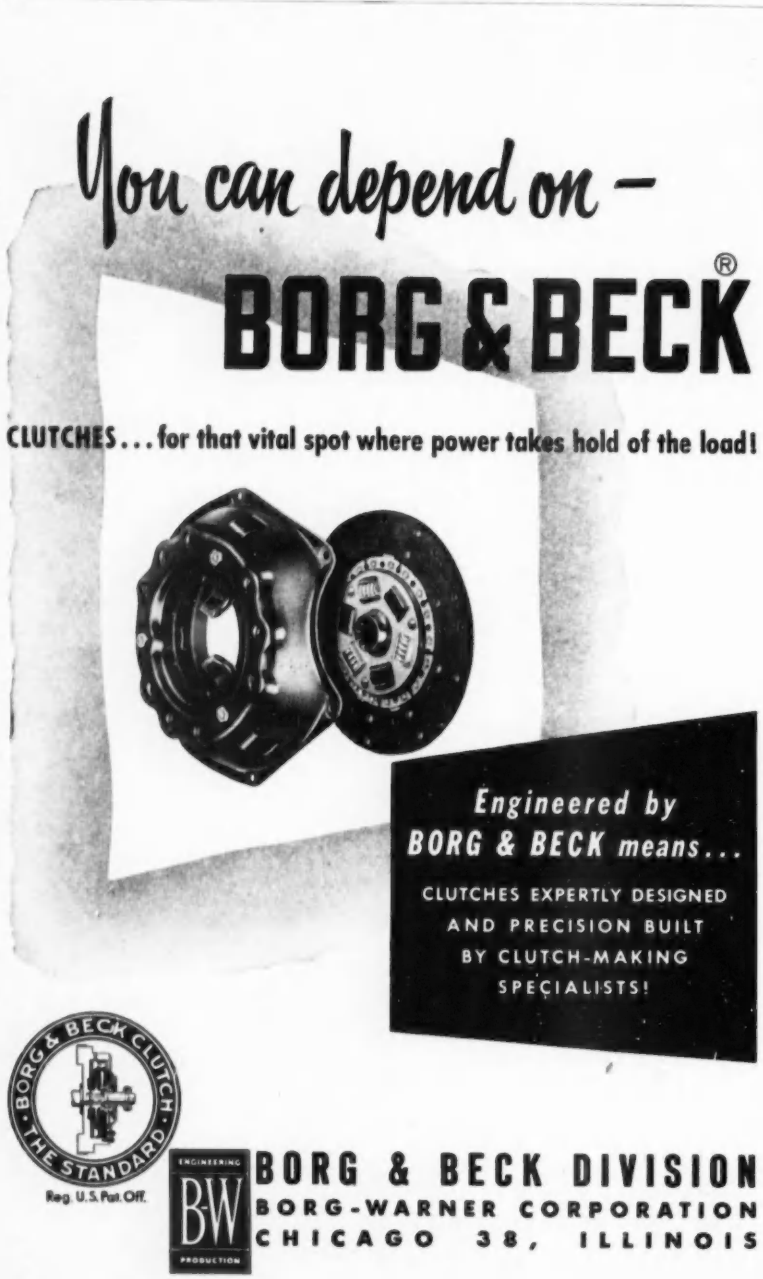
preliminary run from Los Angeles to New York in 7 hr. 15 min., an average speed of 358 mph.

Speed Record Hair Splitting

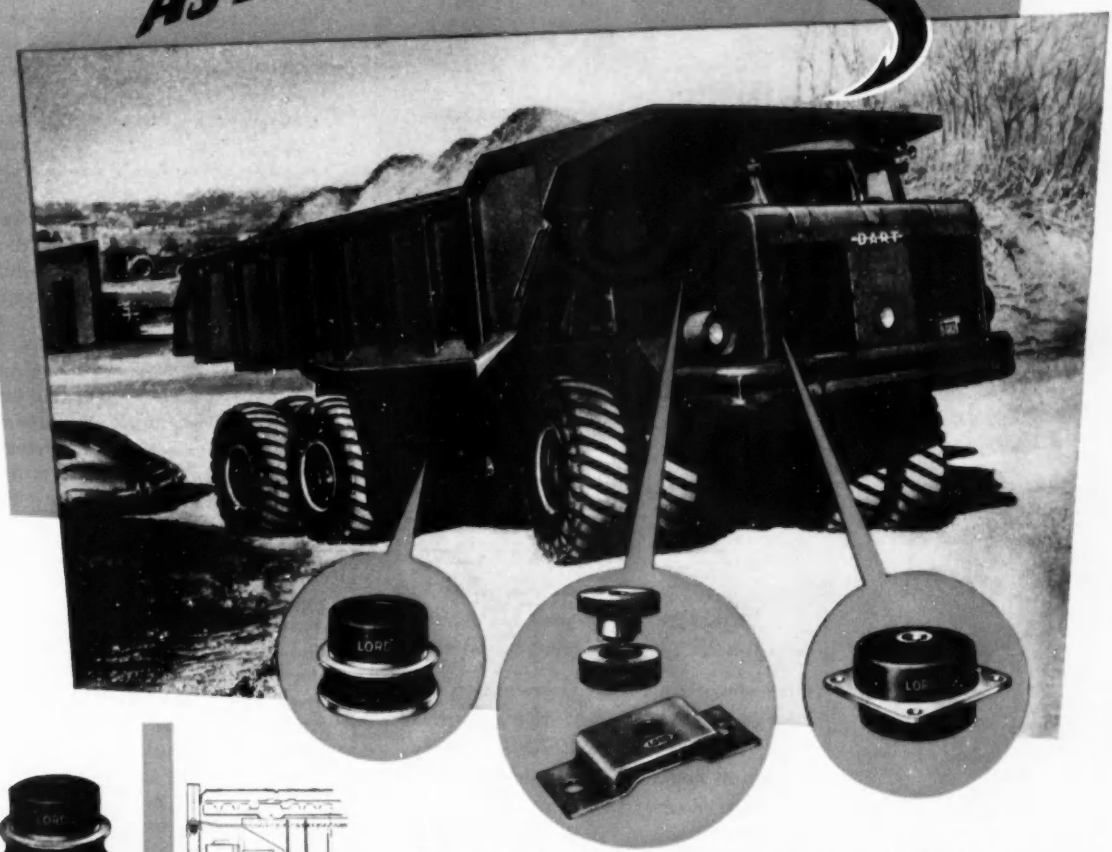
One of the biggest things ever to happen to Naval Aviation was its capture of the world's speed record of 753.4 mph by its Douglas XF4D-1 Skyray carrier fighter, the first Navy combat airplane to hold the record and the first Navy plane to hold the record in six years. Hearing of this fabulous speed, the British frankly admitted they couldn't hope to match it and abandoned their attempts. But the Air Force, in the unnatural position of having the Navy a winner, quickly brought its comparatively untested North American YF-100 Super Sabre to the speed course and confidently stood back while test pilot Pete Everest set out to show the Navy some real speed. But after the desert dust had settled, the vaunted YF-100 had averaged only 757 mph over the course, less than the one per cent minimum excess over the previous record to warrant F.A.I. recognition. Repeatedly, the YF-100 failed to best the Navy mark (although the weather didn't cooperate and failed to produce the hot day required for maximum mph equivalent of the Mach number capabilities of the airplane). Finally, the Air Force found a loophole in the F.A.I. law: the standard course is three km long but the F.A.I. would recognize a speed record over a different distance, whether it was one per cent better or not. Quickly, the YF-100 blistered over a 15 km course at an average (four passes, two in each direction) speed of 754.98 mph. Although less than one per cent better than the Skyray's mark, National Aeronautic Association officials said the Super Sabre mark—not the Skyray figure—would be submitted to F.A.I. for world's record reognition. But this isn't the end of the hair-splitting: the XF4D-1 used a Westinghouse J40 engine developing 11,600 lb of thrust but is now installing a Pratt & Whitney J57 of 13,200 lb of thrust in a new Skyray. The next hot day (85 F or better) following completion, the Navy will be back at the record course.

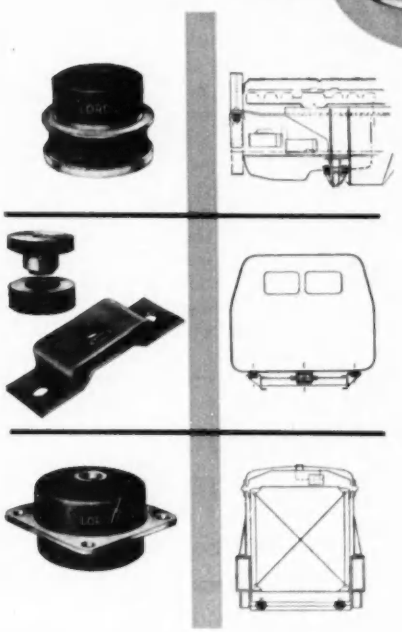
Fairchild Victory

Award of the Chase C-123B production contract to Fairchild Engine and Airplane Corp. means that this Hagerstown, Md., company has wound up with all of the prizes in one of the strangest Air Force procurement stories on record. It will be recalled that the Air Force gave Kaiser a contract to build the Fairchild C-119 Packet at the outbreak of war in Korea. Kaiser owned 49 per cent of the stock of Chase Aircraft Corp., whose C-123 Avitruk was a strong, direct competitor of the C-119. Two years later the Air Force found itself in the ridiculous position of paying Kaiser $1,339,140 each for the C-119 at the same time it was paying Fairchild $265,067 each for the same airplane. The Kaiser contract was cancelled and the 88 unfinished airplanes on the contract were awarded to Fairchild. This left Kaiser with the Chase C-123 contract, which was to have followed the C-119 on the Willow Run assembly lines. But the Air Force cancelled this, too, let it out for competitive bids and awarded the contract to Fairchild to build 160 of the twin-engine assault transports. Thus, Kaiser is out of the airplane business, Chase Aircraft Corp. has



LORD Bonded-Rubber Mountings... As Rugged As This





The world's largest "off-the-road" truck, Model 60 Dart, hauls 60 tons of copper ore from the huge shovels in the pits of The Bagdad Copper Mines of Bagdad, Arizona to the mine rim over tortuous, twisting, climbing roadways impossible for any other means of transportation. Contributing to the desired performance of this mammoth vehicle, Lord Bonded-Rubber Mountings cushion the twin radiators against vibration and shock, thus protecting the vital cooling system and reducing maintenance costs.

The two 350 hp. diesel engines and transmission assemblies are protected from the shocks of rough going by Lord Mountings . . . these same mountings provide a barrier between damaging engine vibration and the truck itself. To complete the job Lord Mountings protect the cab.

As rugged as the products they protect, Lord Bonded-Rubber Parts are used every day to improve the performance of industrial products large and small . . . Let us work with you.

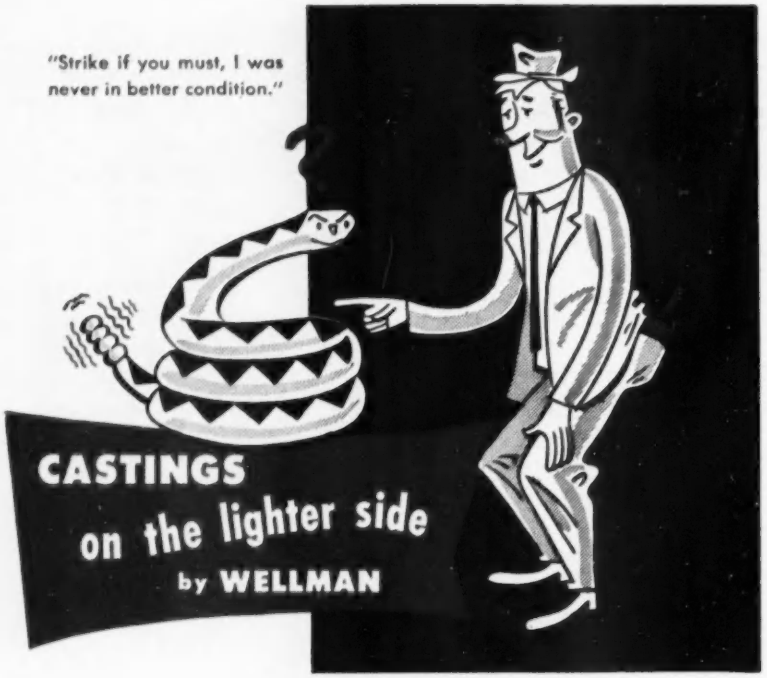
BURBANK, CALIFORNIA 233 South Third Street
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DAYTON 2, OHIO 410 West First Street
DETROIT 2, MICHIGAN 311 Curtis Building
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CLEVELAND 15, OHIO Room 811 Hanna Building

LORD MANUFACTURING COMPANY • ERIE, PA.

LORD BONDED RUBBER

Headquarters for **VIBRATION CONTROL**

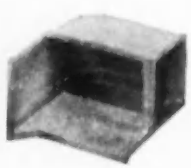
"Strike if you must, I was never in better condition."



CASTINGS
on the lighter side
by WELLMAN







We've never been in better condition to handle your requirements for lightweight castings, magnesium or aluminum.

Our four completely equipped plants and staff of competent personnel enable us to offer you the finest production facilities.

Purchasing, engineering, production and management men in industries everywhere have found the name WELLMAN synonymous with sound castings made under close metallurgical control . . . complete facilities for a wide range of products . . . a sincere interest in their problems.

We'll be glad to send a representative to call, and in the meantime, our new catalog No. 53 will tell you more about us and our almost half century of experience.

Well-Cast MAGNESIUM AND ALUMINUM CASTINGS
Well-Made WOOD AND METAL PATTERNS

THE WELLMAN BRONZE & ALUMINUM CO.
Dept. 3, 12800 Shaker Boulevard Cleveland 20, Ohio

been dissolved and Fairchild is building not only the C-119 but the C-123 as well!

Paying the Freight

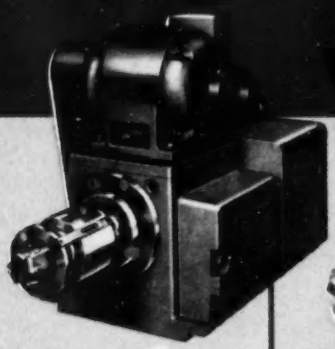
The Department of Commerce, under constant urging from the Congress has spent the last few years trying to work out a system under which users of the Federal Airways (lights, navigational and communication radio equipment and airport blind landing systems) would pay for the service, but no agreement could be reached by the interested parties. Now, however, the Civil Aeronautics Administration has proposed a charge of 2½¢ a gallon fuel tax on aviation gasoline as the simplest solution to the problem. The Federal Airways have an assessed value of $85,305,959 and cost $75,692,93 annually to operate. The 2½¢ gas tax would provide only about $25 million, or one-third the operating costs of the system but the report strongly hints that this is only an initial step. The report reveals that the cost of the system can be allocated 50.7 per cent to scheduled airlines, 33.8 per cent to the military and 15.5 per cent to civilian users. The airlines quickly condemned the new plan, pointing out that the existing 2¢ a gallon gas tax constitutes a "user charge," that the airlines should not be required to pay a user charge for Federal facilities when the trucking, shipping and railroad forms of transportation do not, that the scheduled airline industry's strategic value to the nation in time of war had not been considered in the study and that the airlines were not financially able to assume such a burden over periods of reduced business. If the gas tax idea doesn't carry, the CAA has a system of graduated charges for airplane licenses that it will propose. One way or the other the Government seems intent on charging for its services in providing the "aerial highway" for those who fly.

AUTOMOTIVE INDUSTRIES . . .

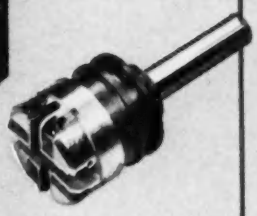
Is your News Magazine of Automotive and Aviation

MANUFACTURING

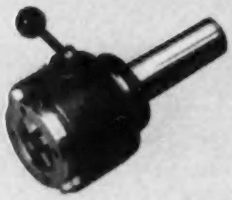
Reduce THREAD COSTS and *Increase* THREAD QUALITY with MURCHEY TOOLS



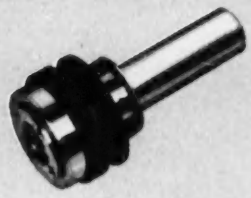
Precision-Pak with die heads and collapsible taps automatically taps holes up to 4" dia., cuts external threads up to 3½" dia.—also bores and reams. Lead accuracy assured by precision lead screw.



Rotating Die Heads, Type "ORB" with snap action trip and quick change radial type chasers, cut straight threads ⅛" to 5" dia.



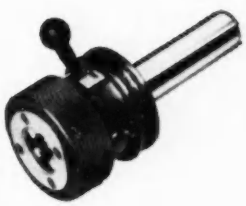
Non-rotating Die Heads, Type "OLB" with pull off snap trip and quick change radial type chasers, cut straight threads ¼" to 5" dia.



Rotating Die Heads, Type "TRB" with snap action trip and quick change Tangent chasers, cut straight threads ⅝" to 2" dia.



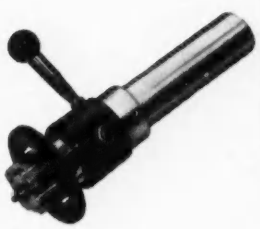
Non-rotating Tangent Die Heads, Type "TLC", with pull-off snap trip and quick change chasers, cut straight threads ¾" to 2" dia.



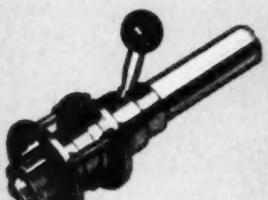
New 4 in 1 Type "ACB" Die Heads, Rotating and Non-Rotating feather action trip, cut straight threads ⅛" to 4" and tapered pipe threads ⅛" to 3½".



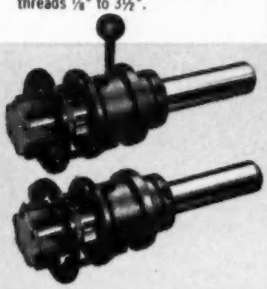
Solid Adjustable Taps "EHB" and "RHB" with removable chasers, cut threads 1¼" to 5" dia.—ideal for salvage work.



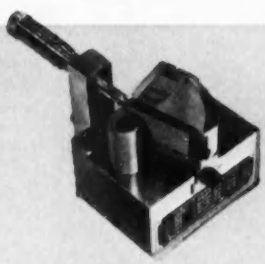
Standard Collapsible Machine Taps, Rotating or Non-Rotating, with easy size adjustment, cut straight threads 1¼" to 7" dia.



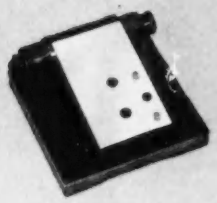
Semi-receding Pipe Taps, Rotating or Non-Rotating, with taper receding action, cut 1" to 6" taper pipe threads. May be arranged for straight threads also.



Type "L" Machine Taps, Rotating or Non-Rotating, with 18 interchangeable nose pieces and 2 bodies, cut a range of straight threads to 6¼" dia.



Tangent Chaser Micrometer Setting Fixture provides longer chaser life and better threads through more accuracy in setting chasers in their holding blocks.



Universal Chaser Grinding Fixture for use on either a surface or cutter grinder assures accuracy in grinding chasers of all types.

For more complete information on Sheffield-Murchey threading tools, get in touch with your local representative or write for Catalog MU-153.

Murchey Division, The Sheffield Corporation
Dayton 1, Ohio, U. S. A.

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

SHEFFIELD

6548

Chrysler-Briggs Purchase

(*Continued from page* 55)

Briggs holdings is expected to increase Chrysler's investment in property, buildings, and equipment to about $327 million.

The Briggs-Chrysler deal came unexpectedly after months of rumors. In fact when it was announced, details of the transfer had not yet been worked out so it is still not clear as to just how the financial details will be consummated or how the facilities will be operated by Chrysler. It is expected, however, that it will become another Chrysler division with Chrysler personnel taking over active management.

Chrysler has been moving toward acquiring its own body facilities for some time and in recent months has announced that it would build its own coupe body at Evansville and also establish a body plant at San Leandro, Calif. There are several obvious reasons why Chrysler would want to have its own body facilities, such as cost and quality control. Another factor that has been a disrupting influence on Chrysler production schedules is the labor situation at Briggs which Chrysler now will have under its own control. In buying Briggs outright, Chrysler is getting an established organization which now is building primarily Chrysler products and which can easily be integrated into its own corporate structure.

Currently Briggs supplies all of the bodies for Plymouth plus some special body parts for other divisions. Dodge, De Soto and Chrysler build their own bodies but are supplied with stampings from Chrysler's 9-Mile Stamping Plant and Highland Park Plant and also some from Budd Co. Chrysler said that it sees no reason at this point why the Briggs purchase should change its relationship with Budd.

Briggs was founded in 1909 by Walter O. Briggs, Sr., as a company engaged in painting and trimming wooden bodies and making touring car tops. Manufacture of a complete automobile body was started in 1919 with the company eventually becoming the largest independent automobile body builder in the world.

Chrysler has always been a principal customer of Briggs and has obtained about 50 per cent of its car bodies from that source for the last 25 years. Chrysler business represents about 80 per cent of the Briggs total body business. Briggs also, until early this year, operated a wholly owned subsidiary in England, Briggs Trust, Ltd., which has been sold to Ford Motor Co., Ltd., of England. The Briggs profit position has always been a good one, with a total of more than $5.7 million in earnings last year. At the end of 1952 it had current assets of nearly $83 million and cash of more than $9.38 million. Value of plants, real estate, and equipment stood at slightly more than $35.1 million, or approximately the same price Chrysler is paying for 12 of the 16 plants.

(*Turn to page* 151, *please*)

Manufacturers of...

HARDENED and GROUND PARTS

for over 40 years

SINCE the day of the duster and goggles, The Brown Corp. has meant highest quality precision parts for the automotive industry. Today, Brown Parts serve trucks, tractors, trailers, buses, axle builders, off-the-road machines and Diesel locomotives. The production methods and facilities we have developed are unexcelled — uniform product quality is assured—deliveries are reliable—service is efficient. Ask any of our long list of satisfied customers throughout the industry.

For further information about our specialized production of hardened and ground automotive and industrial parts, just drop us a note. We invite an opportunity to quote on your work.

Henry W. Brown
PRESIDENT



KING PIN

Parts include . . .
King Pins
Shackle Bolts
Shackle Pins
Brake Anchor Bolts
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Idler Shafts
Stub Axle Shafts
Steering Ball Bolts
Beam Balls and Bolts
5th-Wheel Rocker Shafts
Wheel Studs
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter.

THE BROWN CORP.

213 BELLEVUE AVE. SYRACUSE, N. Y.

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Production Pointers from GISHOLT

TIME-SAVING IDEAS



Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

GETTING MORE WORK PER CHUCKING WITH C/F TURRET LATHE

Only One Tool Change Required for Variety of Sizes with Expert Setup

This producer's problem was one of *sizes.* How to get fast operation on chuck bodies in a variety of sizes with minimum possible tooling and changeover.

The solution is smart . . . and noteworthy. A Gisholt 1L Cross Feeding Saddle Type Turret Lathe was selected for the job. This was equipped with a 15″ 3-jaw air chuck. This not only kept chucking time low, but also, by the use of adjustable serrated jaw bases, just one set of jaws sufficed for operation 1 to handle the numerous sizes of workpieces.

The quick indexing square turret on the cross slide has tools for turning, facing, chamfering, etc. These work simultaneously with tools from the hexagon turret, a time saver on any job.

Cross Feeding Turret Speeds Job

The hexagon turret is equipped with three stub boring bars for boring, counterboring, recessing or back facing. Size is set with the cross feeding turret; therefore, these same boring bars are used on many sizes of parts.

Also carried on the hexagon turret are two box-type tool posts. These are used for facing, boring or recessing. Again, because of the cross feeding hexagon turret, they are used for workpieces of various sizes.

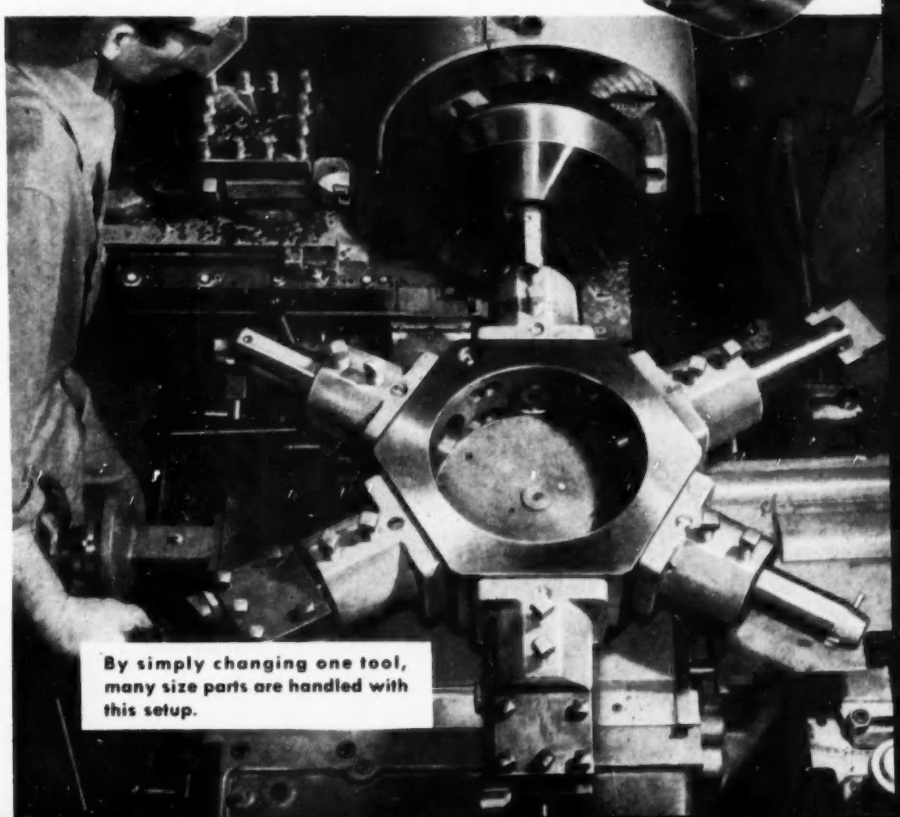
The sixth tool on the hexagon turret is a spade cutter for final sizing. This is the only tool special for each job. A quick change of this single tool readies the machine for the next job. The high production Saddle Type Turret Lathe has two additional attachments for even greater versatility. A threading attachment permits threading the hub when required. A taper attachment offers tapers up to 8 inches per foot for a wide variety of diameters.

This job shows again how you generally can do more work with fewer tools. When you specify a cross feeding turret lathe, Gisholt's 66-year experience can help you.

Simple tooling, combined with the time-saving cross feeding hexagon turret, give maximum efficiency in handling parts of various sizes.



Typical completed workpiece.

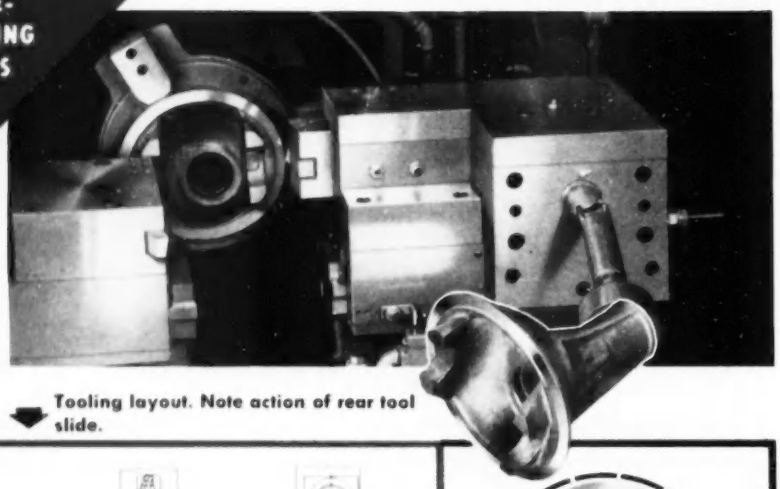


By simply changing one tool, many size parts are handled with this setup.

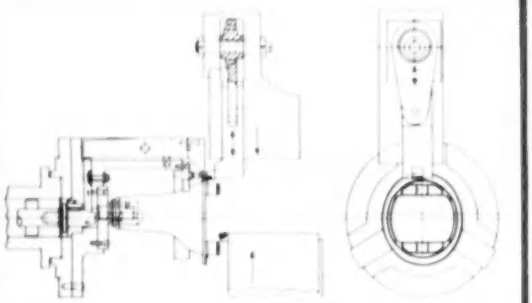
TIME-SAVING IDEAS

ELLIPTICAL MACHINING MADE EASY

Standard Simplimatics Solve Special Problem



Tooling layout. Note action of rear tool slide.





Circle indicates elliptical shape of workpiece.

An elliptical diameter was the stickler here. How to machine the oval shape . . . and do it on a standard machine and do it automatically?

The answer, this manufacturer found, was with the 3D Simplimatic Automatic Lathe. To do the elliptical pilot diameter on this differential carrier, a standard machine is used. Only a special cam-operated auxiliary tool, slide mounted on the standard rear slide, is required. This does both facing and turning and moves in and out two times each spindle revolution, generating the elliptical shape. When conventional facing and turning are called for, this slide is simply locked in position.

The standard front slide can be used for either facing or turning the bearing pads, merely by re-positioning at a 90° angle. Time for this part is 1.75 min. and one operator easily handles two identical machines for all production needed. Four different carriers are handled with simple changeover.

The simple addition of a special reciprocating tool slide equips standard Simplimatics for fast, automatic production of elliptical parts.

For complete picture reports on this and 30 other interesting jobs, write for new Simplimatic catalog.

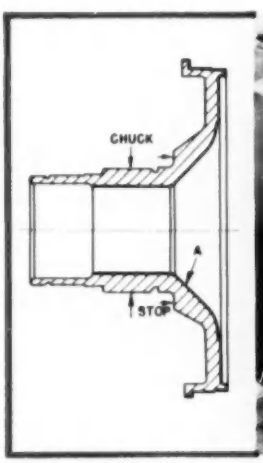
NOVEL SETUP FOR STEEP BORING

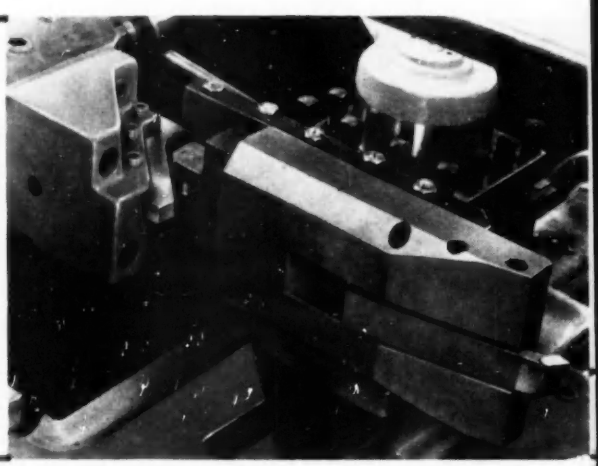
This Idea Pays Off on Ram Type Turret Lathe Job

The next time you are faced with generating a steep bore similar to this, remember this production pointer.

The problem surface (see A in drawing) combines a face, radius and a 45° angular bore. Using a standard Gisholt No. 4 Ram Type Turret Lathe, a special cam is mounted on one face of the hexagon turret. On the square turret is a special spring-loaded roller slide. Here's how it's done:

Both the hexagon turret and square turret carriage are brought into position and locked. The cross slide carrying the square turret is then fed forward. As the roller on the slide tool engages the cam, the tool bit generates the interior surfaces shown. From start to finish, the job is simple. All other tooling is standard. Thus, you can handle this job—or a variety of others—quickly, economically, with very reasonable tooling costs.





The complicated interior of these rotors are generated with repetitive accuracy by the cam-guided slide tool in the square turret.

Note how sliding tool on square turret is guided by cam on hexagon turret.

GISHOLT

TIME-SAVING IDEAS

SHELL PRODUCTION...ON THE DOUBLE

No. 12 Hydraulic Lathes Enlisted for Speedy Operation

Speed was the No. 1 requirement here . . . in centering and cut-off operations on 75mm. and 105mm. shells.

Here's how two different plants are pushing production using identical setups on No. 12 Hydraulic Automatic Lathes: The forgings are located from the bottom of the cavity on a mandrel and held by two sets of air-operated expanding fingers.

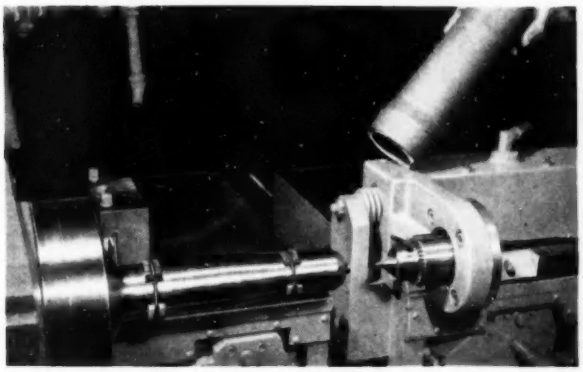
The left rear slide carries a tool block with a single tool for cut-off to length. The right slide carries an auxiliary slide on which is mounted a speeder with a center drill. The main slide moves back at the end of the cycle to clear the work for unloading.

Floor-to-floor time on the 75mm. shell (photo A) is about 0.6 minutes. Time for the 105mm. shell (photo B) is approximately 0.8 minutes. In both cases, the operators have ample time to handle two or more machines because of the automatic cycle.

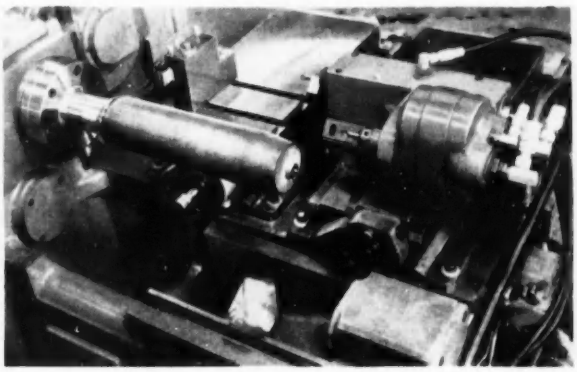
In this first machining operation, shells are faced to length . . . open end is squared . . . and proper center is established—all handled automatically, quickly and economically.

A complete catalog on the No. 12 Hydraulic Lathe is available.

(A) Close-up of No. 12 Hydraulic Automatic Lathe for work on 75mm. shell shown.



(B) Time for this 105mm. shell is 0.8 minutes.



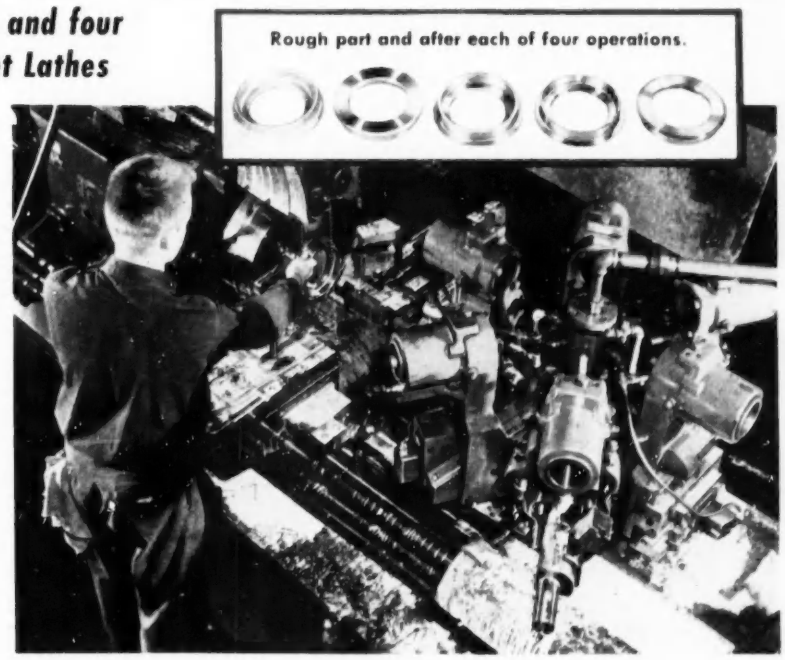
4-MACHINE SETUP MAKES FAST WORK OF THIN-WALL PARTS

Costs are Low with one man and four Fastermatic Automatic Turret Lathes

This problem was one of accurately producing parts which require considerable stock removal, leaving them thin and frail. This precludes taking off too much metal at one time. Also, heavy chucking pressure has to be avoided to prevent distortion.

The only practical way to do it is by spreading the work over a series of relatively light cuts and doing the job automatically to keep costs low. The Fastermatic Automatic Turret Lathe, therefore, was the logical solution—with four machines handling all operations. All machines can be handled by one man since total labor time is six minutes per piece. The .004" tolerance demanded by the thin-wall section is easily met because of the Fastermatic's automatic cycle and the elimination of human error.

These thin-wall parts are accurately and economically produced by a sequence of light cuts with four Fastermatics and one man.



Setup on one of four Fastermatics doing this job.

GISHOLT

TIME-SAVING IDEAS

HOW BALANCING PROTECTS THIS VITAL AIRCRAFT ASSEMBLY

Required Correction Shown by Direct Readings

Vibration means trouble for aircraft cabin superchargers. To insure smooth, dependable operation at high rotating speeds is this Type 13S Gisholt DYNETRIC Balancing Machine.

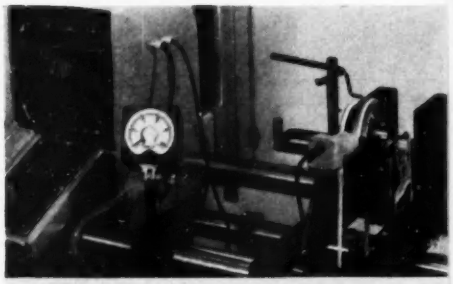
This 6-lb. assembly is supported in a cradle, rotated at 2300 r.p.m. and the amount and location of unbalance in each plane recorded. Stock is then ground off until a recheck indicates that the tolerance of .424 gram-inches has been met.

Each scale unit on the machine's direct-reading amount meter represents .1 gram-inch of unbalance. Therefore, the operator need balance to only 4.24 scale units on the meter to be within the prescribed tolerance for each correction plane. The extreme sensitivity of the machine with dial readings which provide an amplification of unbalance effect, permits greater ease and handling speed.

Whether unbalance is read in terms of stock to be removed or length of material to be added, ease of calibration is just one important feature of Gisholt Balancers.

Unbalance in terms of gram-inches is quickly measured by this Balancer with correction made by grinding off metal.

DYNETRIC BALANCERS GISHOLT



Simple to operate, this Balancer gives fast, accurate unbalance readings in gram-inches.

Production Balancing

. . . is one of the many helpful subjects fully covered in the Gisholt Balancing School—only service of its kind available to industry. Write for details and starting dates . . . four classes scheduled for January and February.

SIMPLE SOLUTION TO SPECIAL CRANKSHAFT PROBLEM



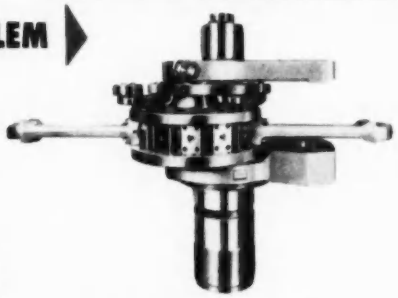
Superfinishing large bearing surface by means of attachment to boring mill.

Nordberg Shows How Big Job is Handled At Small Investment with Superfinishing

Like many others, Nordberg Manufacturing Company solved an otherwise difficult problem through the simple expedient of Superfinishing. Extra-long bearing life is assured because Superfinish takes these critical surfaces down to base metal, removing the soft, annealed "smear metal" left by grinding heat.

The crankshafts in Nordberg Radial Engines have a *single* throw and require only two main bearings. With the force of 2125 h.p. acting on these bearings, as in the case of a 12-cyl. model, you can see the need for an accurately controlled bearing surface.

This is done at extremely low cost, both in equipment investment and in time—because of the adaptability of this modern process. Using existing equipment, a No. 3 Superfinishing Attachment is mounted in a standard tool head of a vertical boring mill. The workpiece is clamped to the rotary table in the usual manner, completing the simple setup.



Superfinishing is satisfactorily accomplished with on-hand equipment . . . without the expense of a special machine for this operation.

See how the basic advantages of Superfinishing—better, longer-wearing surfaces that cost less—can be applied to your problems. The textbook, "Wear and Surface Finish," reports fully on Superfinishing: ask for it.

With a low-cost attachment for existing equipment, these very large bearings get better, longer-lasting surfaces through Superfinishing.

No. 11-1253
614

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Write for your copy of Gisholt's new general catalog.

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Chrysler-Briggs Purchase

(*Continued from page* 146)

There are, of course, many problems involved in taking over the property by Chrysler, such as defense contracts now held by Briggs, union problems involving seniority, pensions and similar items, and valuation of inventory which Chrysler will buy.

Packard has not indicated what it will do about its source for bodies but it is considered likely that it may set up its own facilities at its new plant in Utica, Mich., originally built for jet engine production and now being used only partially for that purpose because the contract has been reduced. Another interesting speculation is that Packard now might join with one or more of the other independent companies in establishing body facilities using certain common components, thereby greatly reducing die amortization cost which always has been an important cost penalty, individually, because of low volume.

BOOKS . . .

ELEMENTS OF ELECTRICITY, *by William H. Timbie, published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price, $5.50.* The revised fourth edition of this 631-page book retains its major purpose of presenting electrical engineering material in a clear way without depending heavily on mathematics. Sections on circuit analysis, direct-current machinery, electrochemical processes, and gaseous conductors are among those revised.

FIRE PREVENTION AND PROTECTION FUNDAMENTALS, *by Gilbert E. Stecher, published by The Spectator, 56th & Chestnut Sts., Philadelphia 39, Pa. Price, $10.00.* A new approach to problems of fire prevention and protection based on a study of combustion is described in this 744-page book. Much data on flash points, ignition points, kindling points, explosive ranges and pressures, and the heat of combustion is given. Atomic radiation lamps as a source of ignition, and new means of measuring temperatures and fighting fires are discussed. Other subjects treated are the nine general phenomena producing fire; 35 causes of fire in industry: exposure, occupancy, water supplies, public fire departments, flammable liquids, flammable gases, flammable dusts, building construction, automatic sprinkler systems, special extinguishing systems, and many others.

COOLIDGE BALLS

CHROME ALLOY STAINLESS STEEL

•

Finest:

ELECTRIC FURNACE STEEL
HEAT TREATMENT
LAPPED FINISHES

•

THESE FACTORS COMBINE TO MAKE THE FINEST STEEL BALLS OBTAINABLE BECAUSE THEY CONTRIBUTE TO CLOSER SURFACE UNIFORMITY—BETTER STRAIN DISTRIBUTION—HIGHER LOAD CARRYING CAPACITY—LONGER LIFE

•

Used in:

BALL BEARINGS • AUTOMOTIVE • AIRCRAFT
FARM AND INDUSTRIAL EQUIPMENT
MACHINE TOOL • OIL WELL AND OTHER
IMPORTANT APPLICATIONS

•

COOLIDGE
CORPORATION
BOX 488 • MIDDLETOWN, OHIO

MEN *in the* NEWS

(*Continued from page* 25)

Andrews-Alderfer Co.—**E. D. Parks**, **R. Craig Whitmore**, and **G. W. Williams** are now regional sales managers.

Thew Shovel Co.—**R. G. Thibaut** has been made service manager with **C. W. Raby** as his assistant.

Electric Auto-Lite Co., Gauge Div. —**O. E. Samuelson** has been appointed purchasing agent.

A. O. Smith Corp.—**Peter S. Blake** has been made works manager of the automotive frame plant now under construction at Granite City, Ill.

Borg-Warner Corp., Marvel-Schebler Products Div. — **William J. Hanley** has been promoted to the controllership of the Automatic Transmission Dept.

Continental Aviation & Engineering Corp., Turbine Div.—**Douglas Knowles** is now assistant manager.

Gould-National Batteries, Inc.— **B. T. Rabuse** has been appointed director of purchases, and **Willard C. Shull** was named purchasing agent.



Federal-Mogul Corp. —Robert E. Klare has been promoted to general manager of all manufacturing operations.

Buick-Oldsmobile-Pontiac Assembly Div., General Motors Corp.—**Carl W. Dobos** has been named production manager of the Linden, N. J., plant, succeeding **Joseph C. Christy**, who has been transferred to the division's plant in Atlanta, Ga. **Henry T. Brian** has been selected to succeed Dobos in Detroit. Brian will be succeeded at Kansas City by **John Holmes, Jr.**

General Electric Co., Aircraft Gas Turbine Div.—Five new departments have been announced, and their managers are as follows: Jet Engine Dept., **George E. Fouch**; Aircraft Gas Turbine Development Dept., **David Cochran**; Evendale Operating Dept., **Bertram W. Mahoney**; Small Aircraft Engine Dept., **Jack S. Parker**; and Aircraft Accessory Turbine Dept., **Jack S. Parker** as acting general manager.

Cleveland Hardware and Forging Co.—**Lewis D. Fykse** has become vice-president in charge of sales of the company's forging, die casting, and truck and body hardware divisions.

U. S. Rubber Co., International Div. —**Thomas R. Worthen** has been appointed manager of advertising and sales promotion.

Consolidated Vultee Aircraft Corp., San Diego Div.—**T. F. McAleer III** has been named chief of manufacturing control.

Air Associates, Inc. — **Louis W. Davis** has been appointed director of public relations and advertising.

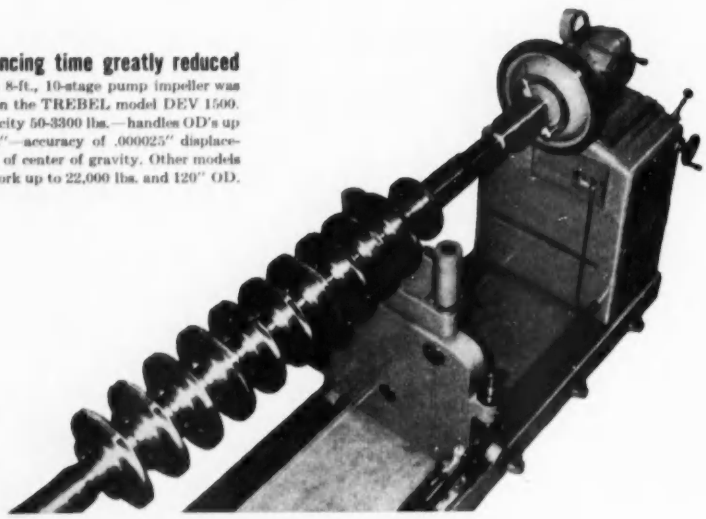
Minnesota Mining & Mfg. Co.— **John G. Kruse** and **Richard L. Post** have been elected assistant secretaries.

Circo Equipment Co.—**William A. Ross** is now sales manager.



White Motor Co.— Harold W. Haldeman has been named service sales manager.

Balancing time greatly reduced
when 8-ft., 10-stage pump impeller was put on the TREBEL model DEV 1500. Capacity 50-3300 lbs.—handles OD's up to 65"—accuracy of .000025" displacement of center of gravity. Other models for work up to 22,000 lbs. and 120" OD.



How major pump maker
detects unbalance in seconds with TREBEL counter-vibration principle

That's all it takes—less than a minute—to locate amount and angle of unbalance in this 10-stage pump impeller, because—

TREBEL BALANCERS use a unique principle in which mechanical counter-vibrations counteract unbalance.

No previous calibration is necessary—operator takes direct readings in the TREBEL BALANCER during the first run—amount of unbalance in ounce-inches; location in degrees.

Any two balancing planes can be selected along entire length of the roter. No cutting and trying—cross effect eliminated.

Readings in units of compensation—such as depth of hole to be drilled, or length of solder to be added—are possible.

No special skills are required.

When this pump manufacturer chose a Model DEV 1500—his third TREBEL—the machine was installed—*and the operator trained*—within two days. And it hasn't required a single service call in 12 months.

This is typical of TREBEL performance in hundreds of important plants here and abroad—the kind of performance *you* can expect, too.

Delivery is prompt; also engineering service and stock parts.

Write for Catalog "B" and ask for TREBEL demonstration at your plant

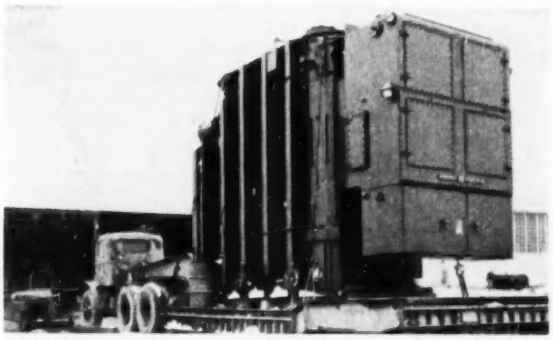
KURT ORBAN COMPANY, INC.
205 East 42nd St., N.Y. 17 • Offices in Cleveland, Detroit, Los Angeles, San Francisco, Houston
Canadian sales by Kurt Orban Canada Ltd., Toronto, Canada

ENGINEERING REPORTS:

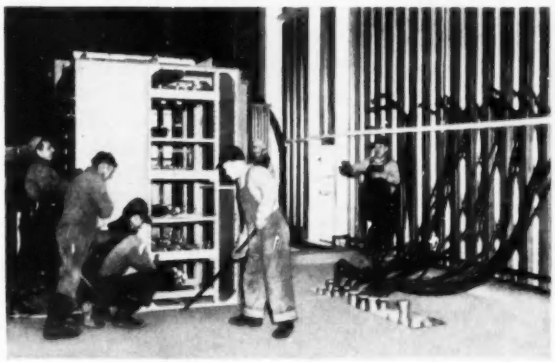


EASY TO SPECIFY AND INSTALL, G-E POWER DISTRIBUTION EQUIPMENT SERVES 1,000,000 SQ FT IN NEW ENGINE PLANT

"Packaged power" speeds Ford expansion



PRE-ENGINEERED to make system design easier, this 35,000-kva transformer is on its way to the plant substation. Use of two units increases dependability of power supply.



EQUIPMENT ARRIVES in unit form for fast installation, to conserve skilled manpower. Here, the switchgear section of a load-center unit substation is moved into position.

Pre-engineered components save months on design and installation of power system for new plant

When Ford Motor Co. built their new plant near Cleveland, the many automatic machines and processes made the planning, selection, and installation of the power distribution system one of the most important phases of plant construction.

Ford, and Hatfield Electric Co., electrical contractors, saved months of engineering and installation time by selecting a power system made up of G-E equipment. Here's how: (1) co-ordinated systems are readily designed using pre-engineered G-E components, (2) "packaged" G-E equipment is quickly installed and connected, and (3) co-ordinated manufacture and shipment of system components saves time.

As in the Ford Cleveland plant, G-E power distribution equipment is being installed in the new assembly plants under construction at Milpitas, Calif., Louisville, Ky., and Mahwah, N. J. You, too, can save time and money on industrial plant electrification by specifying user-preferred G-E equipment. Contact your G-E apparatus Sales Office early in the planning stage of your next project. General Electric Co., Schenectady 5, N. Y. 651-4

Engineered Electrical Systems for the Automotive Industry

GENERAL ELECTRIC

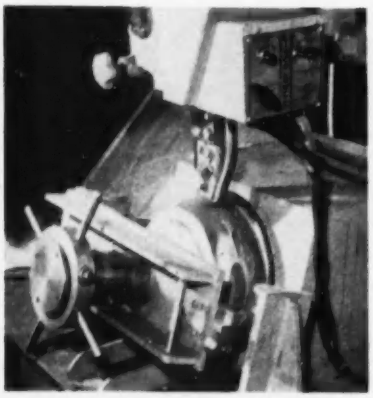


Fig. 1. Weld-assembles *front and rear halves of outer case for new torque converter. After work is loaded and clamped with capstan screw, operator pushes button, "Automatic Lincolnweld" head lowers as work starts to rotate at preset speed. Welding is done with 1/8" diameter electrode in blanket of Lincoln 760 Agglomerated Flux. Production is 60 welded assemblies per hour.*

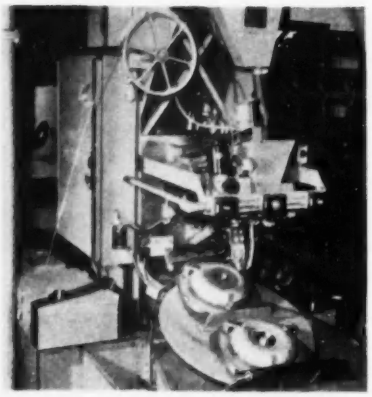


Fig. 2. Weld-assembles *drawn cups to front plates for torque converters. Work is mounted on fixture of indexing table while previous assembly is welded. Open end of cup has a turned step for press fit to joining component. Mating walls are at right angles and are fillet welded to pressure tight joint. Production is automatic . . . 80 pieces per hour with potential increase to 120 pieces per hour.*

LINCOLNWELD...

automatic push-button welding that can simplify your production methods

AUTOMATIC WELDING is now possible at unusually low cost using versatile "Automatic Lincolnweld". Compact in design and completely controlled, the "Lincolnweld" head is adaptable to all types of production machinery to transfer welding skills to the machine and simplify production operations. Welds are made automatically at preset speeds . . . are uniform, top quality, and self-cleaning to cut production manhours and save over 50% over hand welding methods.

A Lincoln specialist in automatic welding near you will gladly show how to adapt "Lincolnweld" to your production machinery. If you wish, he will work with your equipment builder to develop the most efficient designs, assuring quality production at lowest cost. Call or write Dept. 2206.

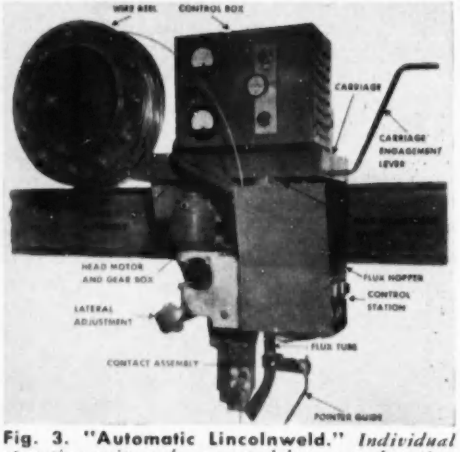


Fig. 3. "Automatic Lincolnweld." *Individual operating units such as control box, control station, drive unit, and wire reel can be mounted separately to meet any requirements.*

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

Industry News

(*Continued from page* 80)

Allstate Venture Is Flop But Sears May Try Again

Sears Roebuck has abandoned merchandising of the Allstate automobile which it had been selling in 17 of its stores since December, 1951. Sears actually began liquidating its stocks last July, is now completely cleaned out of the Kaiser-made cars, and has written the venture off as a failure. The company sold about 2600 Allstates in 20 months.

A Sears spokesman said that, although the actual loss was very small, principal reason for abandoning the car was that the company could not give the same kind of values on the automobile that it could on its other merchandise. He added that Sears has not abandoned the idea of again getting into the automobile business at some future date.

Engineer's Aviation Role to be Honored by ASME

The engineer's contributions to powered flight will be accorded recognition at a luncheon co-sponsored by the American Society of Mechanical Engineers, the Institute of Aeronautical Sciences, and the Society of Automotive Engineers on Dec. 1. It will be held in connection with the annual ASME meeting in New York from Nov. 29 to Dec. 4.

Igor I. Sikorsky, engineering manager of Sikorsky Aircraft Div. of United Aircraft Corp., will give the principal address at the aforementioned luncheon. In addition to this affair, the ASME Aviation Div. is planning a number of technical sessions devoted to such subjects as air cargo, heavy presses, and general aviation developments.

General Electric Develops New Flight Control System

General Electric Co. has announced development of a new flight control system. It is designed to meet the high performance supersonic characteristics of aircraft scheduled for production beginning in 1955.

Called the FC5, the development is a fundamental system concept designed to function as a single axis stabilization system. It also functions as a fully automatic relief and maneuvering system.

(*Turn to page* 158, *please*)

NOW SAVE 36% on Installation Time with IMPERIAL Hi-Duty® TUBE FITTINGS

Furnished in Brass, Aluminum, Steel and Stainless Steel





Just Push Tube Into Fitting Without Removing Nut

The sleeve on Hi-Duty Fittings shears off during assembly and becomes permanently attached to tube. Fitting will make repeated tight reconnections.

For Tubing ⅛" to ¾" O.D.

Ask for Bulletin No. 3002

Average Time Required to Assemble Fittings

Type of Fitting	Average Time Each Joint	Joints per Hour
HI-DUTY	13.2 sec.	274
Regular Compression	20.8 sec.	173
Flare	45 sec.	80

Compared to COMPRESSION FITTINGS

Repeated, thorough tests under field conditions reveal that Imperial Hi-Duty Fittings can be assembled in an average time of 13.2 seconds . . . whereas regular compression type fittings take an average of *20.8* seconds. This is a *36%* saving in time . . . and precious labor.

Compared to FLARED FITTINGS

Here the savings in time are even more striking since it takes *45* seconds on the average to install a flare fitting compared to 13.2 for Hi-Duty . . . a saving of *71%* in time. A man can assemble better than *3* Hi-Duty Fittings in the time it takes to assemble 1 flare fitting.

Why is the HI-DUTY FITTING so much Easier and Quicker to Assemble?

Fitting furnished with integrated nut and sleeve

To get a tight joint, simply insert tube into fitting and tighten nut. No loose sleeve to drop . . . no flaring required. Makes repeated tight reconnections.

MAKES STRONGER JOINTS

Because sleeve is always in perfect alignment when joint is made and because its design minimizes deformation of tubing, Hi-Duty Fittings assure stronger joints that remain leakproof even under severe service. Tests show Hi-Duty joints will stand over 5 times as much vibration as joints made with ordinary compression or flare fittings.

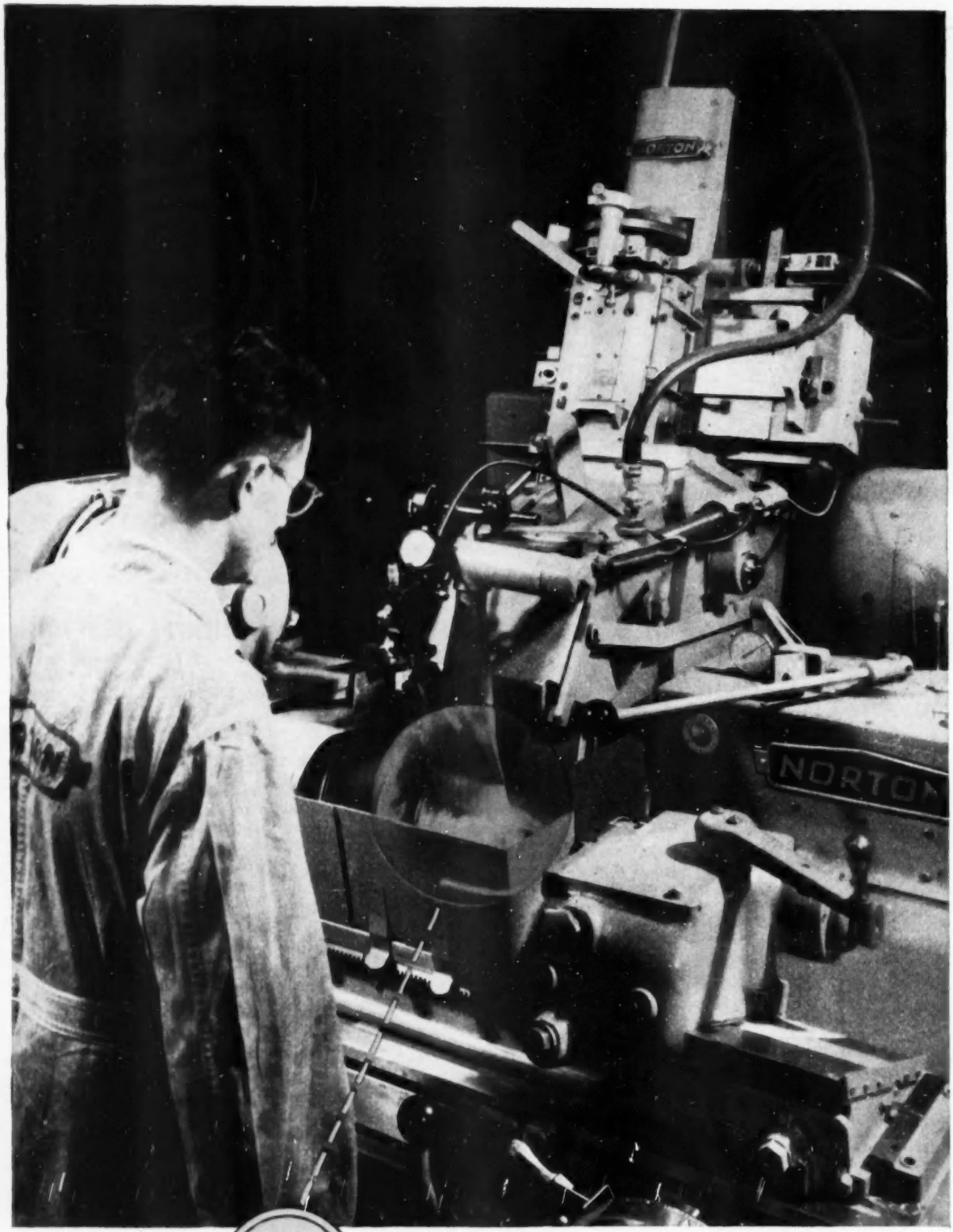
THE IMPERIAL BRASS MANUFACTURING COMPANY

1241 W. Harrison St., Chicago 7, Ill.

In Canada: 334 Lauder Ave., Toronto, Ontario

IMPERIAL

Pioneers in Tube Fittings and Tube Working Tools



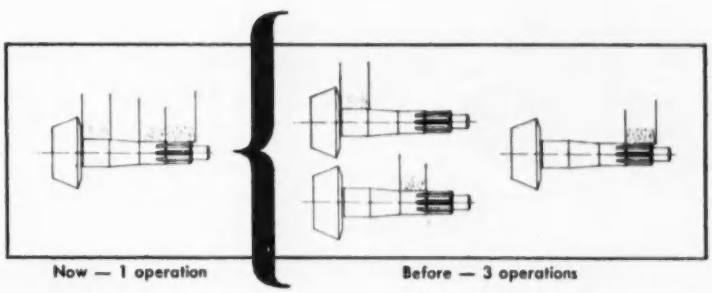
Up 128%

A big step forward in grinding operations, this Norton 10″ Type CTU Semiautomatic Grinding Machine includes many advanced features. For example, the multi-wheel mount and automatic wheel guard type truing device help add the production-boosting, cost-cutting "Touch of Gold."

Now!...production increased 128% with this 3-way

"TOUCH OF GOLD"

A single Norton 10" CTU Semiautomatic replaces 3 separate grinders . . . cuts time, labor, costs



Here's an actual grinding job that shows clearly how advanced grinding techniques can reduce capital investment and step up production to new, profit-boosting highs.

THE PROBLEM. In producing an automotive part, a manufacturer was performing three separate grinding operations. Seeking to better his rate of 35 complete parts per hour per machine, he put his problem up to Norton engineers. They recommended replacing his three old-type machines with a single Norton 10" Type CTU Semiautomatic Grinder with multi-wheel mount and automatic truing device.

THE PAYOFF. Results were real eye-openers. The new Norton Grinder accurately performs all three operations at once . . . and produces 80 parts per hour for a rate increase of 128%!

Many examples of the "Touch of Gold"

That's just one of many instances of how Norton grinders and lappers assure the "Touch of Gold" that means sure savings in time, labor and money. There are many others. For example, another 10" Type CTU upped production from 300 to 600 parts per hour, replacing two old-type machines. And a 6" Type CTU more than doubled production of a part that previously required two separate grinding operations.

Why not add these advantages to your own production? Remember: only Norton offers you such long experience in both grinding wheels and machines to bring you the "Touch of Gold" — to help you produce more at lower cost.

For complete information, see your Norton Representative or write us direct. NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

***To Economize, Modernize With* NEW**

NORTON

GRINDERS and LAPPERS

Making better products . . . to make other products better

District Sales Offices: Hartford • New York • Cleveland • Chicago • Detroit

Industry News

(*Continued from page* 154)

New Trade Group Is Organized

Organization of a new manufacturers' association—the Institute of Environmental Equipment Manufacturers—has been announced. Institute headquarters will be at 30 Church St., New York, N. Y.

Environmental equipment simulates low temperatures, high temperatures, salt-spray, sand-storm, rain, altitude, etc. It is used for laboratory testing of equipment to be used by the military and to determine the effects of weather on such items as plastics, automotive parts, etc. It also is used in manufacturing processes.

One of the Institute's most important functions will be to supply industry with technical data on environmental testing.

Company members include, among others: Sub-Zero Products; Tenney Engineering, Inc.; and Webber Manufacturing Co.

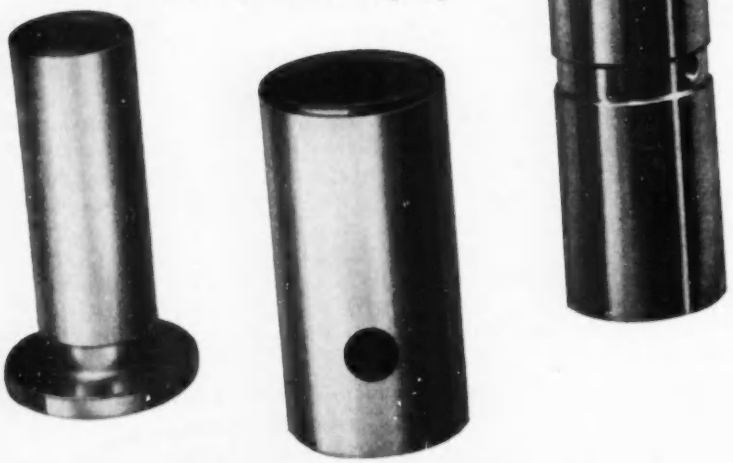


JOHNSON

Tappets

"fill the exacting requirements of today's engines"

Higher horsepower and higher compression put heavier loads on the tappets. Johnson quality assures you the performance you want from these vital engine parts.



"Tappets are our business"

JOHNSON JP PRODUCTS INC.

MUSKEGON, MICHIGAN

Manufacturing Aired at AMA Conference

Manufacturing problems, ranging from product planning through production to marketing, were investigated at the national manufacturing conference of the American Management Association last month in Philadelphia.

Discussing manufacturing techniques, Ronald St. Martin of Stewart-Warner Corp., described predetermined time and motion techniques as the "best cost reduction tool that has been made available to industry for many years." To help gain the workers' confidence, he said, S-W gives a short "appreciation" course to foremen, in addition to detailed training for those who actually use time standards techniques.

Describing work sampling at the Wolverine Tube Div., C. L. Brisley pointed out savings made by this method of correcting problems at the Decatur, Ala., plant. Also, in a work study of professional engineers' and plant executives' use of time, professional level work done was increased by some 14 per cent, he said.

Operations research applications to manufacturing problems were explained by J. F. Magee of Arthur D. Little, Inc. He discussed the scientific means of finding data on which to base management decisions, including mathematical and other theories, which can supplement the usual services such as market research and industrial engineering.

Research and development can be scheduled, said E. G. Uhl of Glenn L. Martin Co. The engineer needs a plan to pace him, and to tell him when to stop designing. He said most companies should try to train their engineers as good supervisors.

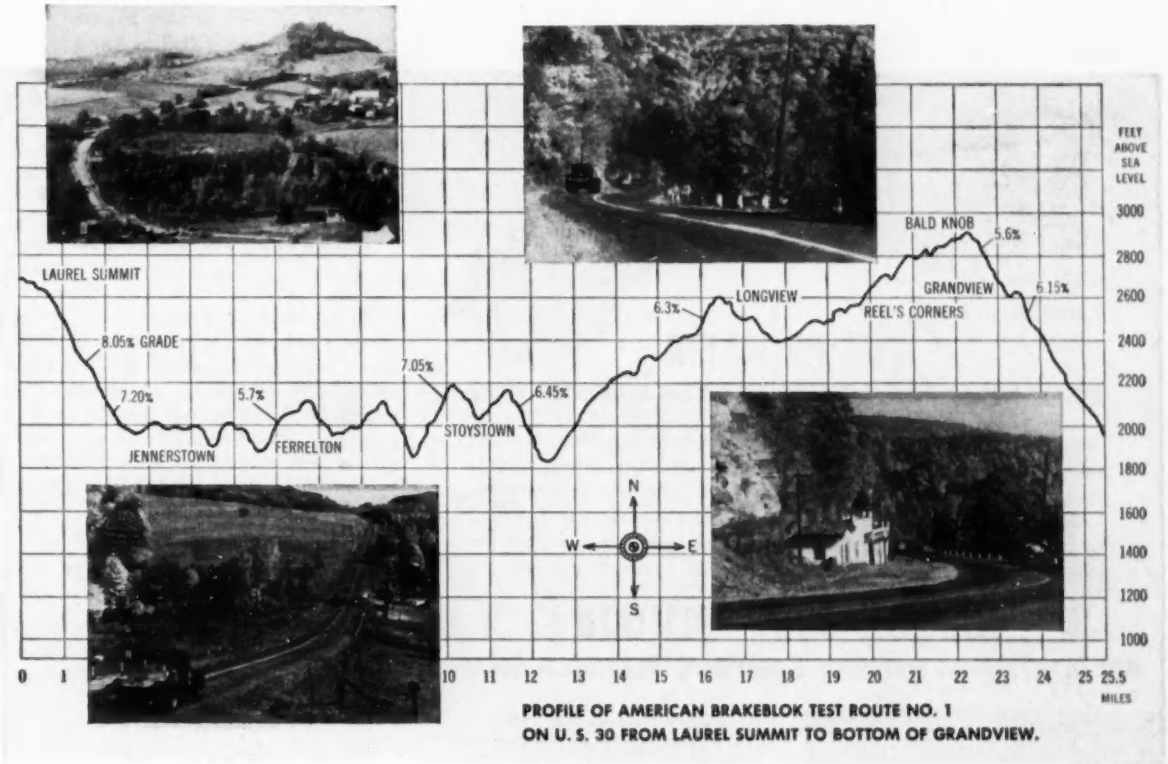
Manufacturing responsibility should begin with marketing, said J. K. Louden of York Corp. He advocated a vertical alignment of responsibility by product lines. He also stressed the need for good vendor relations.

Kaiser Consolidates Electronics Units

Kaiser Motors Corp. is consolidating electronics research and production facilities, formerly operated separately by Kaiser and by Willys Motors, into one division known as Willys Motors Electronics Div. It will include Kaiser facilities at Nashua, N. H., and Arlington, Va., and Willys electronic operations at Toledo, O., and Anderson, Ind.

(*Turn to page* 160, *please*)

TORTURE TRACK *25.5 MILES LONG!*



PROFILE OF AMERICAN BRAKEBLOK TEST ROUTE NO. 1 ON U. S. 30 FROM LAUREL SUMMIT TO BOTTOM OF GRANDVIEW.

. . . to develop the best brake lining for you

American Brakeblok Test Trucks follow this course daily. Under all conditions of load the lining is put through every possible test—performance, fade, recovery, moisture sensitivity, wear, glaze, and maximum heat resistance. Accurate instrumentation records test data for interpretation by our research staff.

The mountains of Pennsylvania were selected because of their sharp grades, long descents, hairpin curves and dangerous intersections, giving the best opportunity for testing brake lining through a wide range of operating conditions.

On this track . . . today's brake linings are perfected—tomorrow's proven . . . for maximum safety, performance and life.

American Brakeblok

THE SAFETY BRAKE LINING

Copyright 1953, American Brake Shoe Company

AMERICAN Brake Shoe COMPANY

AMERICAN BRAKEBLOK DIVISION

DETROIT 9, MICHIGAN

Plants in: **Detroit, Michigan; Winchester, Virginia; Lindsay, Ontario; Gif, France**



THE PROBLEM

DESIGNING FOR LOWER INSTALLATION COSTS

A design engineer wanted to incorporate a manually controlled trip odometer into an automobile speedometer assembly. When it came to designing the control linkage between the knob and the odometer, he was faced with the problem of selecting a method which would be economical both from the standpoint of materials and from the standpoint of easy installation. That's why he chose –

THE LOW-COST SOLUTION

AN S.S.WHITE REMOTE CONTROL FLEXIBLE SHAFT



The adaptability of the flexible shaft control allowed the speedometer to be properly positioned on the dashboard and the odometer reset knob to be placed where the user could readily operate it. Furthermore, the use of the shaft eliminated time-consuming alignment problems – *resulting in important savings in assembly time and costs* – and what is equally important, contributed to a design which adequately met customer acceptance.

It will pay *you* to investigate the cost-reducing possibilities of using S.S.White flexible shafts on your own remote control applications.

Here's Important Design Information

The 256-page Flexible Shaft Handbook has full details on how to select and apply flexible shafts. A copy will be sent free if you write for it direct to us *on your business letterhead.*



THE S.S.White INDUSTRIAL DIVISION
DENTAL MFG. CO.
Dept. B, 10 East 40th St.
NEW YORK 16, N.Y.

Western District Office • Times Building, Long Beach, California

Industry News

(*Continued from page* 158)

N. Y. Air Brake, Kinney Merger in Offing Soon

Stockholders of New York Air Brake Co. and Kinney Manufacturing Co., a subsidiary, will shortly be asked to vote on a plan of merger. Directors of the two companies have already approved the plan.

New York Air Brake acquired a controlling stock interest in Kinney in 1949. The latter company, established 46 years ago, is a manufacturer of vacuum pumps and pumps for the handling of viscous liquids.

The plan of merger will be submitted to stockholders of the two companies for approval in December. Kinney will retain its identity and continue to function as an independent unit with its own manufacturing and sales organization.

General American Buys Parker-Kalon Corp.

General American Transportation Corp. has announced the acquisition of the business and assets of Parker-Kalon Corp. The business will henceforth be operated as the Parker-Kalon Div. of General American.

Parker-Kalon is a manufacturer of screw fastening devices. Its present management is expected to continue in control of its operations and sales.

Mass Transportation Theme of Recent ASCE Meeting

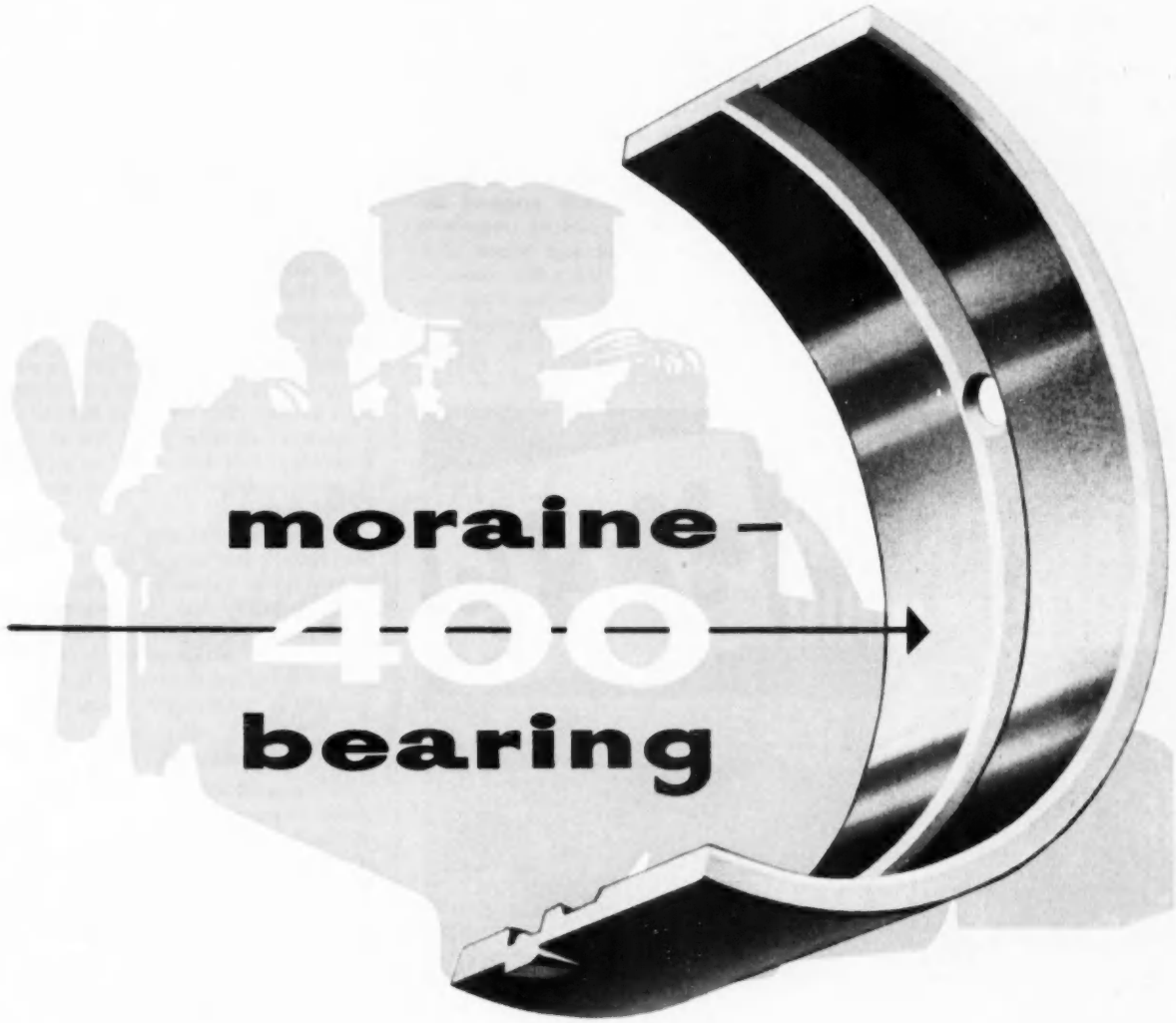
The Federal power policy, heliport standards for the future, and the virtual completion of the Orinoco iron mine project were among the many subjects discussed at the recent annual meeting of the American Society of Civil Engineers in New York City.

The major theme of the Convention, mass transportation, centered largely on reports on design, construction and financing of the New York State Thruway. Leading helicopter authorities emphasized the transport program of the future and the problems involved in the location of readily accessible heliports.

Ipsen Detroit Office

Ipsen Industries, Inc., has announced the opening of a new sales and service division in Detroit. This branch office is located at 10600 Puritan Ave.

(*Turn to page* 162, *please*)



...the starting point in building better engines!

If your new engine project is at a standstill because of bearing length restrictions, you'll be glad to know about the Moraine-400 bearing. This bearing is so modern in concept and so advanced in construction that you may be able to reduce your bearing lengths by as much as 50%, giving added space for strengthening other engine parts.

That's exactly what one of our customers has done, using the Moraine-400. The output of his engine has been expanded beyond what was possible a few years ago, yet there has been no increase in engine bulk. The crankshaft is sturdier, the pistons are larger—and Moraine-400 is giving a bearing life up to five times that which was possible in pre-Moraine-400 days.

There's a definite place for the Moraine-400 bearing in engines of the future. We recommend that your designers and engineers give it serious consideration.

moraine products
DIVISION OF GENERAL MOTORS CORPORATION, DAYTON, OHIO

Industry News

(*Continued from page* 160)

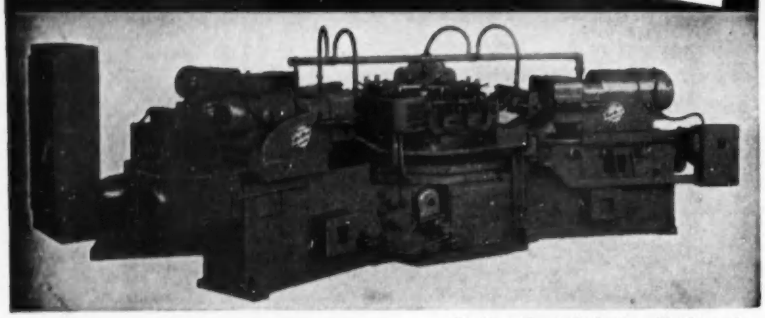
GM Journal Lists Patents by Staff

The latest issue of the *General Motors Engineering Journal* contains an interesting list of patents granted to GM personnel and assigned to the corporation. At least some of them may indicate future GM developments.

The patents include: a combined engine ignition lock and hood latch release to prevent opening the hood while the ignition is locked; a brake construction utilizing side-by-side brake shoes for greater lining area without increasing drum diameter; a door lock operating under very light pressure through a push button, even though door sealing pressure approaches 100 lb.; and an irregularly curved windshield and wiper blade mechanism with the wiper blade so positioned as to have the least possible deviation from the windshield curvature.

Drilling and Reaming

388 KING PIN HOLES PER HOUR



Station Type Indexing Machine for drilling and reaming king pin holes.

On a Davis & Thompson 5 Station Machine

This type MDT FIVE STATION INDEXING DRILLER has five fixtures mounted on the index table. Each of these fixtures holds 2 RH and 2 LH automobile front suspension support arms. Four ROTO-MATIC Power Heads, each having four spindles, perform the following operations:

1. Drill 53/64" dia.—Half way through.
2. Drill .823" dia. — Balance of way through.
3. End Cut Ream .8547/.8550" — Full length of hole.
4. Finish Ream .8635/.8637"—Full length of hole.
5. Load and Unload.

Two RH and two LH pieces are completed at the end of each cycle. Cycling is automatic, and, operator loads and unloads during machine cycle.

4 New Davis & Thompson Mechanical Power Heads

Included in the design of this machine are the new ROTO-MATIC Mechanical Electrical Power Heads operated through screw feed. An important safety feature of these units is the patented overload release clutches on the feed. Because of the simplicity of their design the units require a minimum of servicing.

Free Data

Will be furnished on request.

DAVIS and THOMPSON Roto-Matic

Davis & Thompson Company

6411 W. BURNHAM ST., MILWAUKEE 14, WISCONSIN

Cessna Aircraft Reveals Magnesium Corrugator

Cessna Aircraft Co. reports that it has developed a magnesium corrugator that will form magnesium at room temperature. It is a unit that weighs approximately 2000 lb and is some five ft long, 35 in. high, and 48 in. wide.

The functional part of the corrugator consists of a flat or female plate (the moving part) 60 by 18 in., while the upper roller or stationary unit is approximately six in. in diameter and 17 in. long. The upper roller is free to rotate while forming the material. The female or flat plate is made of kirksite, while the roller is made of cold roll and then milled to accommodate the kirksite corrugation inserts.

The corrugator operates at approximately 400 psi but can be made to operate at varied psi. The present production run of magnesium (.040 gage) sheets are not flat, but have contour, with the depth of the contour being approximately ⅛ in. in a piece of magnesium 17 in. wide.

Waukesha Sales Up

The annual report of Waukesha Motor Company for the fiscal year ending July 31, 1953, shows net sales of over $30.25 million. Net earnings of $3.6 million before taxes were reduced by provision for federal and state taxes and renegotiation to $1.013 million.

GE Evendale Plant Reaches Milestone

General Electric Co.'s J-47 jet engine plant at Evendale, O., recently delivered its 10,000th engine to the Air Force. Packard and Studebaker also produce the J-47.

New Superior Coaches On Pontiac Chassis

Superior Coach Corp. has announced a new line of funeral coaches and ambulances to be manufactured on special chassis produced by Pontiac Div. of General Motors Corp. The new coaches will be built in a newly finished addition to Superior's Southern Div. plant, Kosciusko, Miss.

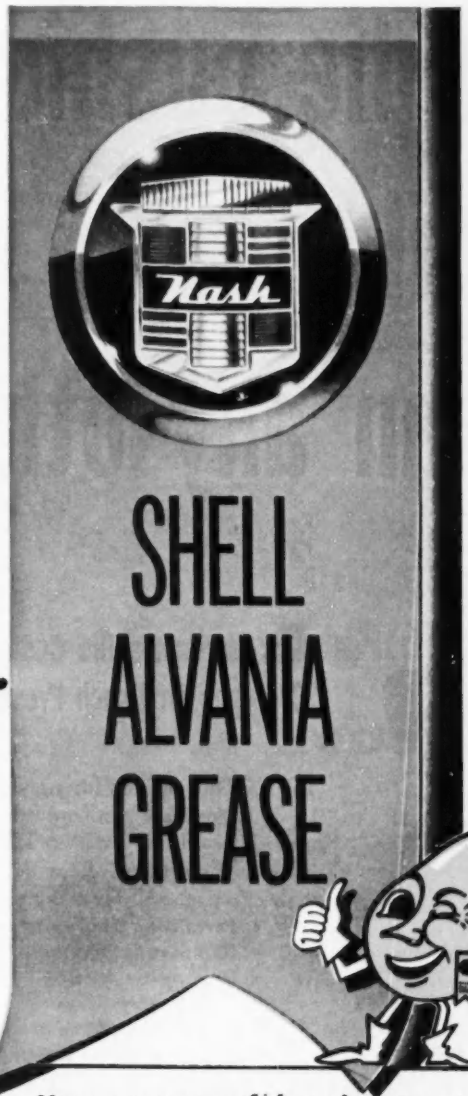
New Knapp Plant

James H. Knapp Co., manufacturers of heat induction furnaces, has moved to a new plant at 1731 Workman Street, Los Angeles. The new facilities are on a 3½ acre site.

(*Turn to page* 166, *please*)

95% of the production machinery at Nash Motors' El Segundo, California Plant

is lubricated with a single grease...



RECENTLY, the El Segundo plant of Nash Motors replaced the 12 to 15 greases they were using with a single multi-purpose grease . . . Shell Alvania.

Here, as in many other plants, Shell Alvania Grease has made a vast difference. Immediate savings were made. The new lubricant cut the cost of handling many special greases. It reduced bookkeeping, inventory and overhead . . . offered more favorable bulk purchasing economies. In addition, Alvania reduced application equipment by 75%.

The real difference was in performance. Bearing failures and breakdown are now at an all-time low. Repair bills in one department were running hundreds of dollars before the change in lubricants. Now, with Shell Alvania Grease, this same department reports that repairs are practically non-existent.

Here are some of the advantages of Shell Alvania Grease:

1. **Shell Alvania Grease flows *freely* in cold temperatures, yet will not run out of bearings under excessive heat.**
2. **Ideal for wet, humid applications . . . it resists water emulsification.**
3. **Shell Alvania Grease has extremely high oxidation stability.**
4. **You'll find that Shell Alvania Grease extends time between greasings . . . a substantial saving in labor and grease.**
5. **Simple inventory . . . just the one grease to stock and apply.**

Shell Alvania Grease can be the answer to a more efficient lubricating program in your plant. For further information write to Industrial Lubricants, Shell Oil Company, 50 West 50th St., New York 20, N. Y.,—or 100 Bush St., San Francisco 6, California.

SHELL ALVANIA GREASE

The True Multi-Purpose Industrial Grease

In die cushions, too, BLISS builds more types and sizes than any other company...



Bliss-Marquette Die Cushion Engineering Ranges from Standard "A" and "C" Types for Punch Presses to large Specials like this Hydro-Pneumatic

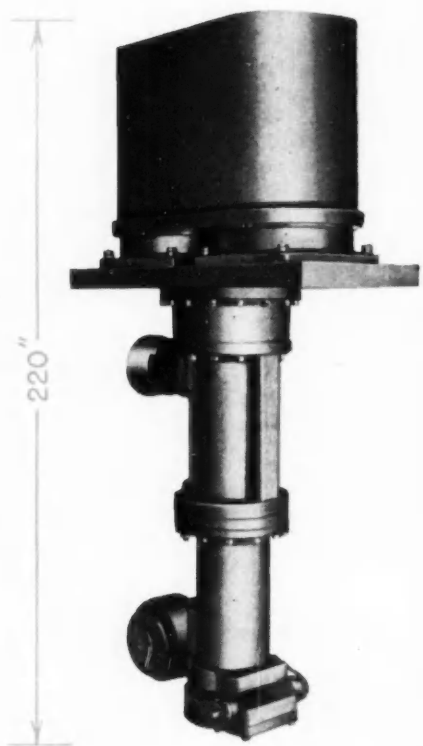
The *right* die cushion for a given application can make a lot of difference in press operation. That's why Bliss engineers have created a multitude of types and sizes to suit individual situations. Bliss designs have demonstrated their effectiveness over many years by...

- ***Permitting deep draw operations at low cost***
- ***Eliminating operations***
- ***Prolonging die life***
- ***Reducing spoilage***
- ***Preventing excessive strains***
- ***Adding another action to presses***

Since these cushions can eliminate many difficulties and make possible substantial savings, *all Bliss S-1, S-2 and Inclinable presses are designed and machined to accommodate them*. Bliss cushions are easy to install, easy to maintain and easily adjusted for work involving any pressures within their capacities.



Bliss builds die cushions in a large number of types and sizes to meet practically any possible condition. You're likely to find the cushion to suit your particular need in Bliss' 60-page Reference Book on types, uses and care of die cushions. Write for your copy.



E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

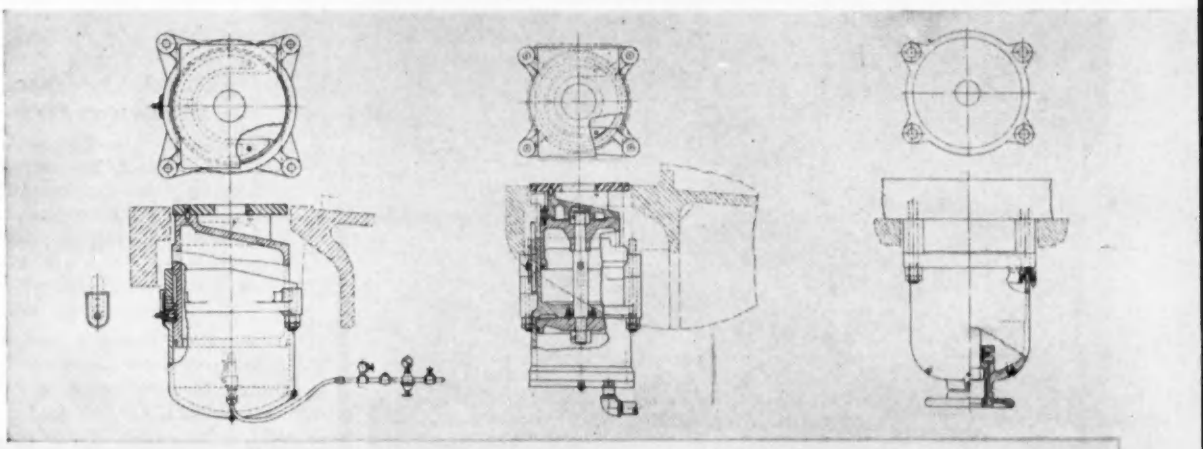
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan
Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

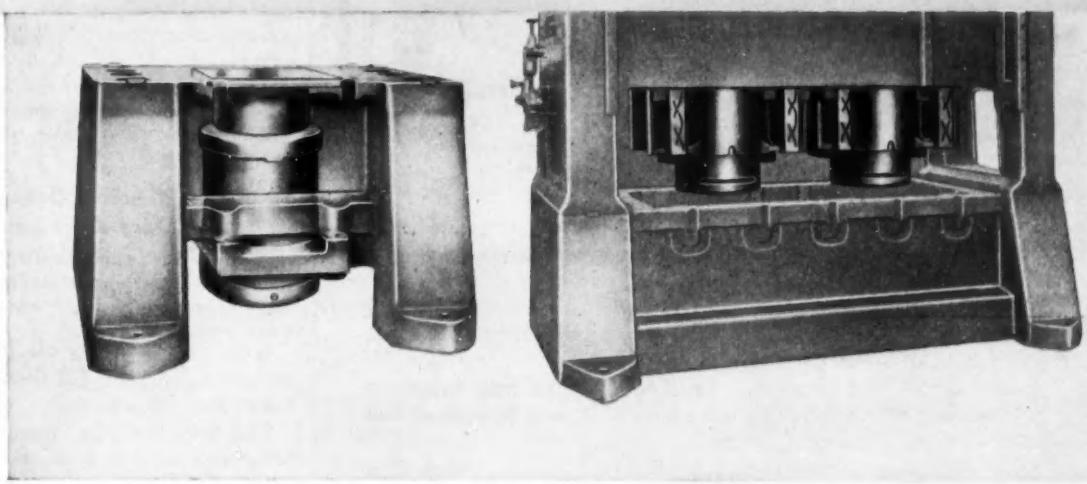
Remember: **for DIE CUSHIONS, Presses,**

FOR INCLINABLE PRESSES Bliss makes a complete series of pneumatic cushions; Type CO (left), requiring no tank for standard strokes; Type CCO (center), requiring a tank only when stroke is over 2", similar to Type CO but with two pistons and cylinders to deliver greater pressures; Type GA (right), having a hollow piston shaft for easy slug removal, self-contained for strokes up to 1".

Note that Type CO and CCO cushions are arranged with openings in the pressure pad to suit the job so that slugs or scrap may be dropped through the die.



Why these Bliss-Marquette Die Cushions for inclinable and straight side presses can improve press room efficiency



FOR S-1 PRESSES Bliss recommends Type CC cushions which feature extra long internal guides to prevent side movement or weaving of the pressure pad. Locking devices can be furnished.

FOR S-2 PRESSES Bliss recommends Types C and CC cushions. The compact design of Type CC permits installation of a double cushion that will draw up to 8".

Rolling Mills, Special Machinery...

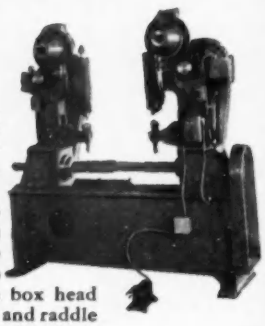
It's Bliss

Speed Production.. Automatically with T-J

RIVITORS



T-J RIVITOR used for automotive clutch plate assembly. Saves time and labor doing a four-fold job—assembling, setting, inspecting and ejecting.

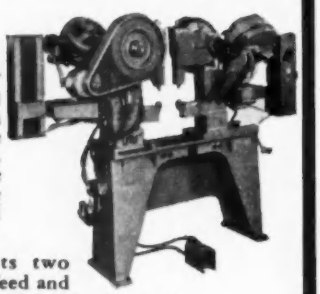


DOUBLE RIVITOR sets two rivets at a time! Equipped with 10" hoppers, and tooled to automatically feed and set two ¼" diam. x ⅝" long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.

CLINCHORS



T-J CLINCHOR . . one of six special 8" throat Underfeed Clinchors used by a large automotive body manufacturer. Feeds and sets 11/16" square cased nuts in outside quarter panels, left and right hand.



DOUBLE CLINCHOR sets two nuts at once! Tooled to feed and set ⅜" x ½" x 1/16" thick Fabri-Steel nuts at each operation. Both Clinchors tripped by same foot-operated valve. Adaptable to wide range of clinch nut setting problems.

Boost production . . . save labor with T-J Rivitors and Clinchors for many assembly jobs today . . . in aircraft, automotive, farm machinery, stampings of all kinds.

T-J CLINCHORS set clinch nuts 3 to 5 times faster! Fully automatic . . . controlled by a single foot pedal! Available in Underfeed and Gravity feed models, throat depths 8" to 36".

T-J RIVITORS automatically feed and set solid rivets . . . with high production! Electrically-powered Rivitor sets 1/16" to ¼" diam. solid steel rivets up to ⅞" long. Air-powered Rivitor sets aluminum alloy rivets up to ¼" diam. or steel rivets up to ⅛" diam. and up to ¾" long. Throat depths 8" to 36".

Write for Clinchor bulletin 847; Rivitor bulletins 646 and 847. The Tomkins-Johnson Co., Jackson, Mich.

37 YEARS EXPERIENCE T-J

TOMKINS-JOHNSON

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

Industry News

(*Continued from page* 162)

Chrysler to Expand Los Angeles Plant

Chrysler Corp. will expand production capacity at its Los Angeles plant by installing two new assembly lines and facilities for body finishing operations previously done in Detroit. The new assembly lines will replace a single line that currently produces all four of the corporation's makes.

New body finishing facilities will include equipment for metal finishing, plating, and trimming, and will be centered in a 550,000 sq ft addition built in 1951-1952. The new facilit are expected to be in operation during the first half of next year.

Kaiser Resumes Car Production

Kaiser Motors got back into production of automobiles at Willow Run Oct. 26, four months to a day after operations were suspended. Kaiser has a new "more competitive" contract with the UAW-CIO which it had made a condition of reopening. It reduces the number of full-time union representatives by about two-thirds and consolidates job classifications to give management more flexibility in work assignments.

Initial production will be confined to the Henry J. Tooling for 1954 Kaiser models is nearly finished, and production will start later this year.

Ryan Receives Orders for More Jet Parts

A contract for approximately $1 million of major components for G.E. J-47 jet engines has been awarded to Ryan Aeronautical Co.

It has been given the responsibility of turning out an additional large quantity of aft frames.

The manufacturing rate is also being accelerated at Ryan on still another new quantity production item —the afterburner for the Westinghouse J-46 jet engine. Details of the J-46, recently released by the Navy and Westinghouse, reveal it as a high-power, low-weight turbojet to be given its first use in the new swept-wing Chance Vought F7U-3 Cutlass, one of the Navy's latest high-speed carrier-based fighters.

(*Turn to page* 169, *please*)



McLouth
STAINLESS
Steel

For the product you make
today and the product you
plan for tomorrow.

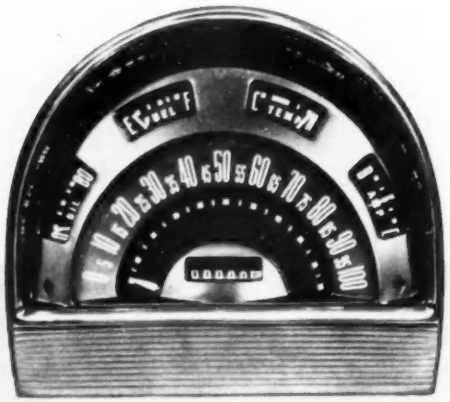
McLouth Steel Corporation
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels

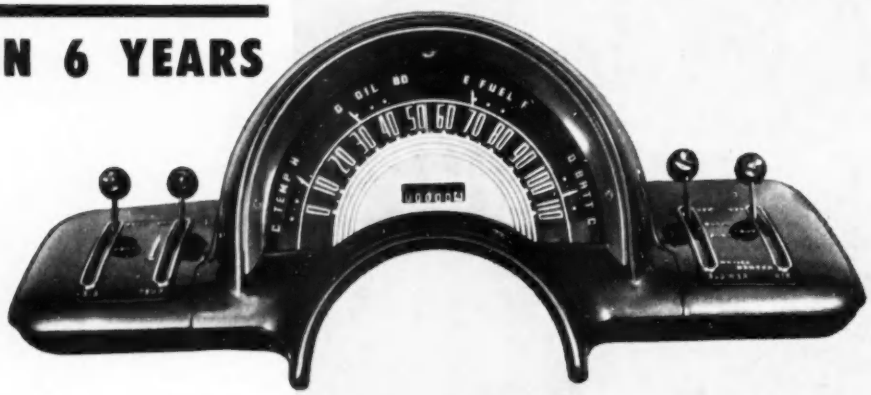
DEMAND FOR

KS SPEEDOMETER

UP 160%

IN 6 YEARS







Early in 1948 King-Seeley completed the development and testing of a new speedometer design using a Cunife magnet. King-Seeley adopted this magnet material because of its inherent stability and imperviousness to shock, vibration, temperature variations and stray magnetic fields.

The general acceptance of this new design has been more than gratifying. Production has increased 160 per cent since its adoption and three new accounts have been added to the list of original equipment users.

This is the automotive industry's recognition of an instrument that has won the car owner's complete approval.

KING-SEELEY CORPORATION

ANN ARBOR, MICHIGAN

Plants at ANN ARBOR, SCIO and YPSILANTI

A611

Industry News

(*Continued from page* 166)

Huge Quantity of Tires Seen Needed in 1954

A. F. Freedlander, president of the Dayton Rubber Co., recently predicted that passenger cars on the U. S. highways would require 50 million replacement tires in 1954. He compared the 1954 estimate with a total of 48 million passenger car tires for this year.

Mr. Freedlander went on to estimate that trucks and trailers next year will require nine million new tires, compared to the 8.6 million in use during 1953. His forecast included a registration of 46.5 million cars and at least 10.5 million trucks and trailers in 1954.

Chrysler Advocates Hiring Handicapped

Chrysler Corp., long an advocate of hiring physically handicapped persons, reports that in the past ten years more than 185,000 such employes have become eligible for work at Chrysler with a large percentage of them hired.

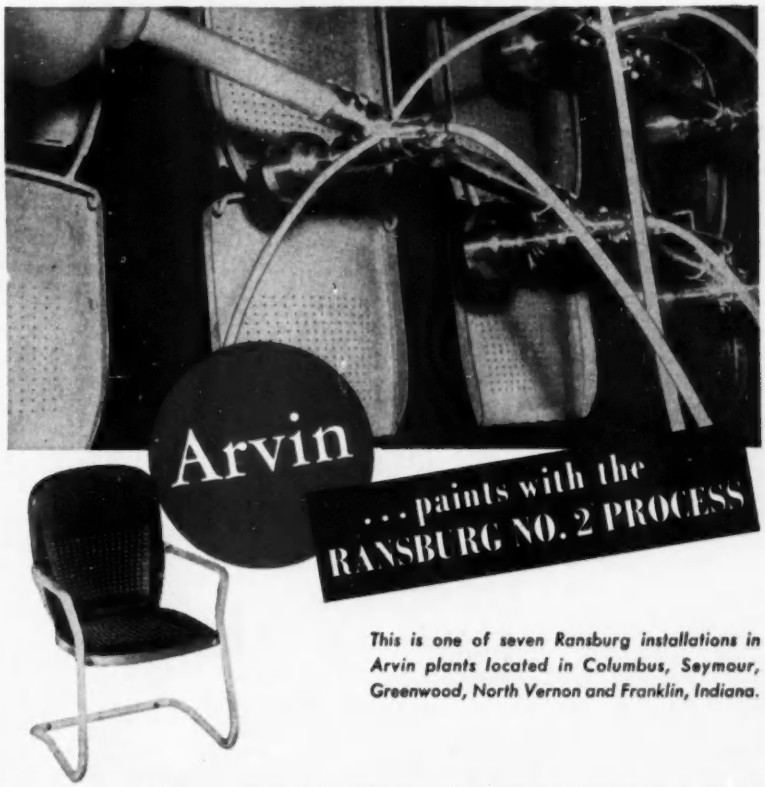
Harry B. Burr, of Chrysler's medical administrative staff, reports that with handicapped employes on the payroll, injuries to employes have steadily declined until they now are below the lowest rate ever achieved prior to the program. An extensive examination and testing procedure is followed, including a five-part placement code by which the medical history and particular classification of the employe is kept highly confidential.

Chemical Process Set For Alkyd Resin Use

California Research Corp., a subsidiary of Standard Oil of California, has announced development of a new chemical process to make isophtalic acid in commercial quantities from metaxylene, a benzene derivative. It is expected to find widespread use in alkyd resins for synthetic varnishes and enamels, such as those used on automobile bodies.

This acid has been produced in very small quantities through a costly wet chemical process, which has kept the price at $25 a pound. Standard Oil now expects to turn out sizable amounts at about 25 cents a pound.

(*Turn to page* 172, *please*)



This is one of seven Ransburg installations in Arvin plants located in Columbus, Seymour, Greenwood, North Vernon and Franklin, Indiana.

When Arvin chair seats and chair backs were redesigned to be perforated with hundreds of little holes in each piece, the former dipping method of coating was unsatisfactory. Here are other reasons why RANSBURG NO. 2 PROCESS was selected to do the finishing job:

1. **Simplicity and rapidity with which colors may be changed without slowing production.**
2. **Less floor space required.**
3. **Provides improved quality with no variance in the required 7/10 mil film thickness.**
4. **Former maintenance and clean-up time reduced to a minimum.**

No savings in paint cost were anticipated. However, the RANSBURG NO. 2 PROCESS—in providing the above, desirable advantages—still enables Arvin to reduce finishing costs 10%. And, that over dip coat!

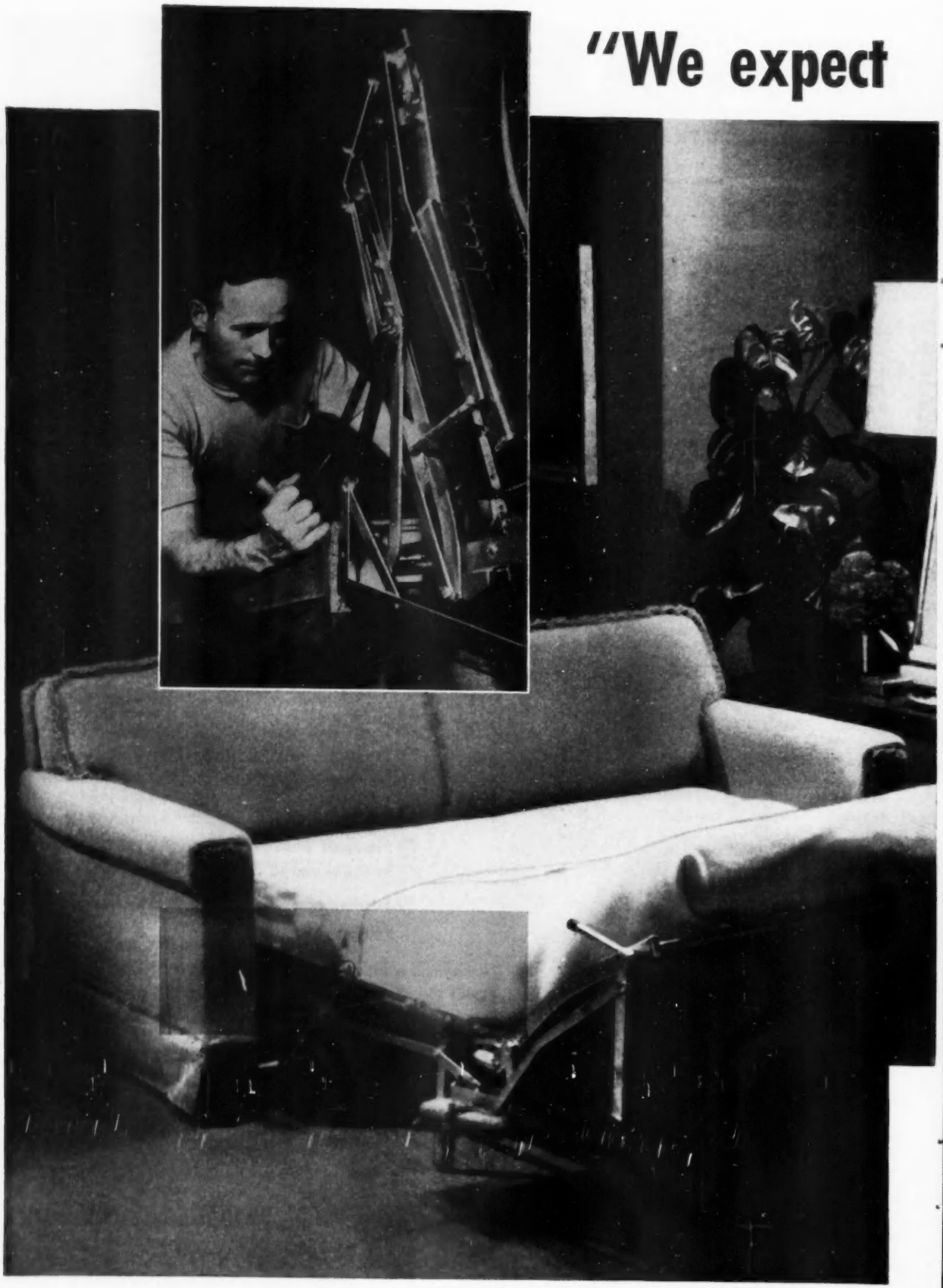
Want to know more about production efficiency of the NO. 2 PROCESS as it applies to YOUR production? Write for literature showing a variety of typical production installations in factories all over the country.

RANSBURG

Ransburg ELECTRO-COATING CORP.

INDIANAPOLIS 7, INDIANA

"We expect



20 years of service or *more*



from these American Quality Springs"

...says SIMMONS COMPANY

World's largest producer of sleeping equipment

EVERY housewife in America knows that the name *Simmons* is an ironclad guarantee of quality when it appears on a mattress or sofa.

If you visited any of the 7 Simmons factories, you'd know why. Simmons has built an unparalleled reputation by *insisting* on fine workmanship and highest quality component parts.

Look at the famous Hide-A-Bed shown here. You don't have to yank and pull to open it into a comfortable bed. It glides open easily on 6 counter-balance American Quality Springs. Each of these 9-inch springs must withstand a stretch to 15 inches. In a 20-year period, these 6 helical springs are stretched to the limit 14,600 times.

We produce these springs for Simmons using a high-grade oil-tempered wire. As a result, the finished springs meet very close load tolerances, and they are consistently straight.

If you need a typewriter spring, an automobile axle spring, or a spring to support a giant locomotive, American Steel & Wire will help you design it. Then we'll produce it—any size, any grade of steel, any shape, any finish. You'll get all this at a price you never thought possible.

Just call your nearest American Steel & Wire district office.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S American Quality Springs

UNITED STATES STEEL

Industry News

(*Continued from page* 169)

Knapp Mills Forms Mexican Company

Knapp Mills, Inc., a producer of lead clad steel and lead clad copper, has announced the formation of Knapp Mills de Mexico, S.A., with headquarters in Mexico City.

The new firm has entered into a contract with a principal Mexican lead products producer, A. Valezzi Sucs., S.A. Under the terms of this contract, the new firm will acquaint Valezzi with all of the knowledge, skills and methods required to produce the high quality lead products.

In return, Knapp Mills of Mexico has received an exclusive contract for the distribution and sale of such products in Mexico and the U. S. This arrangement reportedly will eliminate the common practice of shipping Mexican lead to America only to be fabricated and shipped back to Mexico in finished form.

IHC Division to Sell All Fageol Van Trucks

The Motor Truck Div. of International Harvester Co. has contracted with Twin Coach Co. to provide the sales outlet for the entire production of Fageol Van trucks. Sales and service will be handled exclusively by IHC and its dealers. Twin Coach representatives will provide liaison between factory and International truck district offices.

Hamilton Standard Starts Sizable Building Program

Work has been started on two additions which will increase by 60,000 sq ft the factory area of Hamilton Standard, Div. of United Aircraft Corp. One addition, running from the west end of the plant to the receiving room, will house two big tube-reducing machines and a new large-capacity hot-form press.

The second addition will accommodate vapor-blast equipment and extra shipping space. A truck garage and a ramp entrance to the plant will also be included.

Engelberg Purchases Porter-Cable Line

The Industrial Abrasive-Belt Grinder Div. of the Porter-Cable Machine Co. recently became the property of the Engelberg-Huller Co., Inc.

Acquisition of the Porter-Cable line is the second of two major purchases made by Engelberg-Huller within the past year. In 1952, the company bought the complete Rome Machinery Sales and Engineering series of polishing lathes and automatic buffing and polishing equipment.

British Device Aids Jet Planes

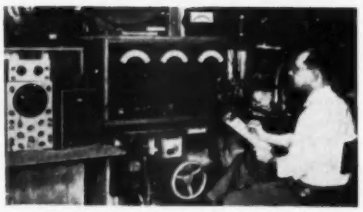
A small tube the size of a fountain pen cap, which is said to increase the accuracy of rocket-firing jet planes a hundred times is the latest device British designers have produced to help fighter pilots. The RAF is considering its use on all jet fighters.

Known as the Airstream Direction Detector and evolved by Ferranti, the tiny device senses the minutest variations in air stream direction relative to the flight of the aircraft. It then records these variations in direction on a dial in the pilot's cockpit and shows the pilot the altitude of his aircraft and its angle relative to the air flow.

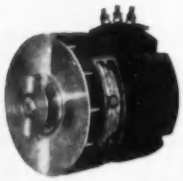
(*Turn to page* 174, *please*)

BRING YOUR ELECTRICAL PROBLEMS TO Leece-Neville

In four decades of service to the automotive industry, Leece-Neville has developed the ability to design and produce special units. Our staff and equipment for this purpose are outstanding and we welcome the opportunity to custom-engineer special and heavy-duty electrical equipment to meet particular problems.



For Example: Alternator Systems



Leece-Neville has developed dozens of different models of AC-DC Alternator Systems for such applications as passenger car, truck, bus, off-highway, railroad and marine. They have been proved by performance for over 7 years.

Capacity ranges for various system voltages include: to 95 amps for 6 volt; to 180 amps for 12 volt; to 100 amps for 24 volt; to 50 amps for 32 volt.

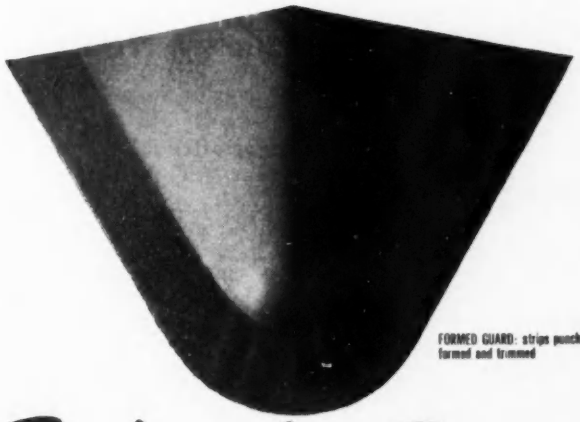
As in all Leece-Neville units, rugged design and precision manufacture combine to give L-N Alternators unmatched reliability and extreme life. Be sure to specify Leece-Neville. For all the facts, write The Leece-Neville Company, Cleveland 14, Ohio.

L-N custom-engineered products include:
ALTERNATOR SYSTEMS
D. C. GENERATORS
CRANKING MOTORS
SMALL MOTORS FOR HEATERS, etc.
REGULATORS
SWITCHES
AIR CRANKING MOTORS

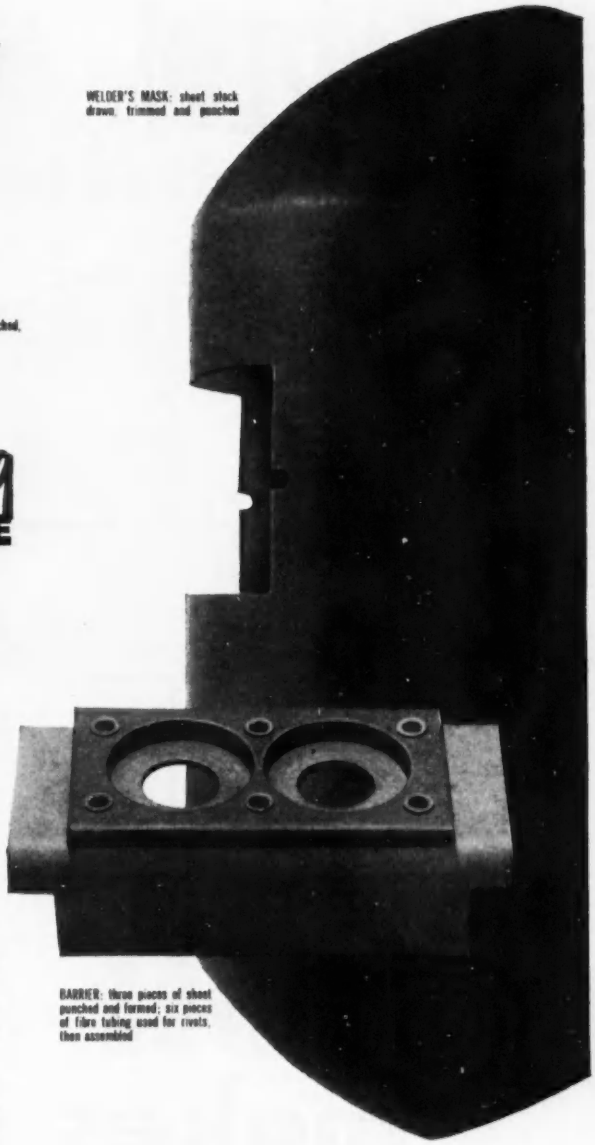
YOU CAN RELY ON Leece-Neville

CUSTOM ENGINEERED ELECTRICAL EQUIPMENT SINCE 1909

TRUCK BUS DIESEL OFF HIGHWAY PASSENGER RAILROAD MARINE INDUSTRIAL



FORMED GUARD: strips punched, formed and trimmed



WELDER'S MASK: sheet stock drawn, trimmed and punched

BARRIER: three pieces of sheet punched and formed; six pieces of fibre tubing used for rivets, then assembled

For Low-Cost Forming
C-D-F DIAMOND FIBRE

- Arc resistant
- Mechanically strong
- Easily formed and machined
- Non-corroding
- Good dielectric qualities
- Light weight

For many product applications, Diamond Vulcanized Fibre is a proven, logical answer. Here is a low-cost material that can be bent, formed and drawn into permanent shapes. The "fibres" flow when moisture, heat and pressure are applied. They "set" as heat and pressure remove the moisture. Repeated moistening and drying never alter the nature, structure or quality of vulcanized fibre.

Deep shapes, such as welders' helmets, are made from a special "long fibre" C-D-F grade, a medium density, lightly calendered fibre with high impact strength.

C-D-F first made fibre in 1895 and has a wealth of manufacturing and fabricating experience. At Bridgeport, Pa., C-D-F has its own rag paper mill, is perhaps the world's biggest rag picker. Good vulcanized fibre depends on good, clean rags. C-D-F uses every human and mechanical means to keep Diamond Fibre free of metal. Thin and thick fibre in every size, type and color is stocked. Fibre materials handling equipment is manufactured for every industry.

Also, C-D-F does big-scale fabrication and forming at its Newark, Del., plant: Railroad track insulation, welders' helmets, machine covers, athletic equipment are formed here. Tubes, rods and combination fibre and laminated plastic Dilecto conite fuse tubing are major C-D-F Newark products.



GEAR: sheet sawed, turned, milled, drilled

TRACK INSULATION: sheet stock sheared, formed and punched

C-D-F IS A BIG, RELIABLE SOURCE OF SUPPLY!

Good deliveries, good prices, reliable products. That is the reputation of C-D-F with the world's leading users of vulcanized fibre. Whether your needs are big or small, C-D-F is a worthy manufacturing facility . . . ready to work for and with you. Call your C-D-F sales engineer (offices in principal cities). Write for Diamond Vulcanized Fibre catalog and samples.

CDF THE NAME TO REMEMBER . . . DIAMOND VULCANIZED FIBRE

Continental-Diamond Fibre Company

NEWARK 2, DELAWARE

which SCREW will be specified here?



pheoll makes it!

HERE IS a single source able to supply all your requirements for screws, bolts and nuts. Pheoll offers the most complete line . . . the most extensive stocks available. Call Pheoll on your next order.

PHEOLL

PHEOLL MANUFACTURING CO.
5700 ROOSEVELT ROAD, CHICAGO 50, ILLINOIS

SCREWS NUTS • BOLTS • SPECIAL COLD HEADED PRODUCTS

Industry News

(*Continued from page* 172)

Automotive Fibres Buys N. Y. Plant

National Automotive Fibres, Inc., has purchased a plant in Cohoes, N. Y., from Beaunit Mills, Inc., to provide expanded facilities for manufacturing automotive textile trim products. The three-story building recently was modernized and comprises approximately 180,000 sq ft.

Reeves Bros. Acquires Vulcan Rubber Products

Reeves Brothers, Inc., a textile manufacturer has announced the acquisition of Vulcan Rubber Products Corp., Brooklyn, N. Y., and Duroflex, Inc., Buena Vista, Va. Both companies are producers of industrial coated fabrics, and both will become separate corporate subsidiaries of Reeves Brothers, Inc.

Bell to Gain in Future from B-47 Stretchout

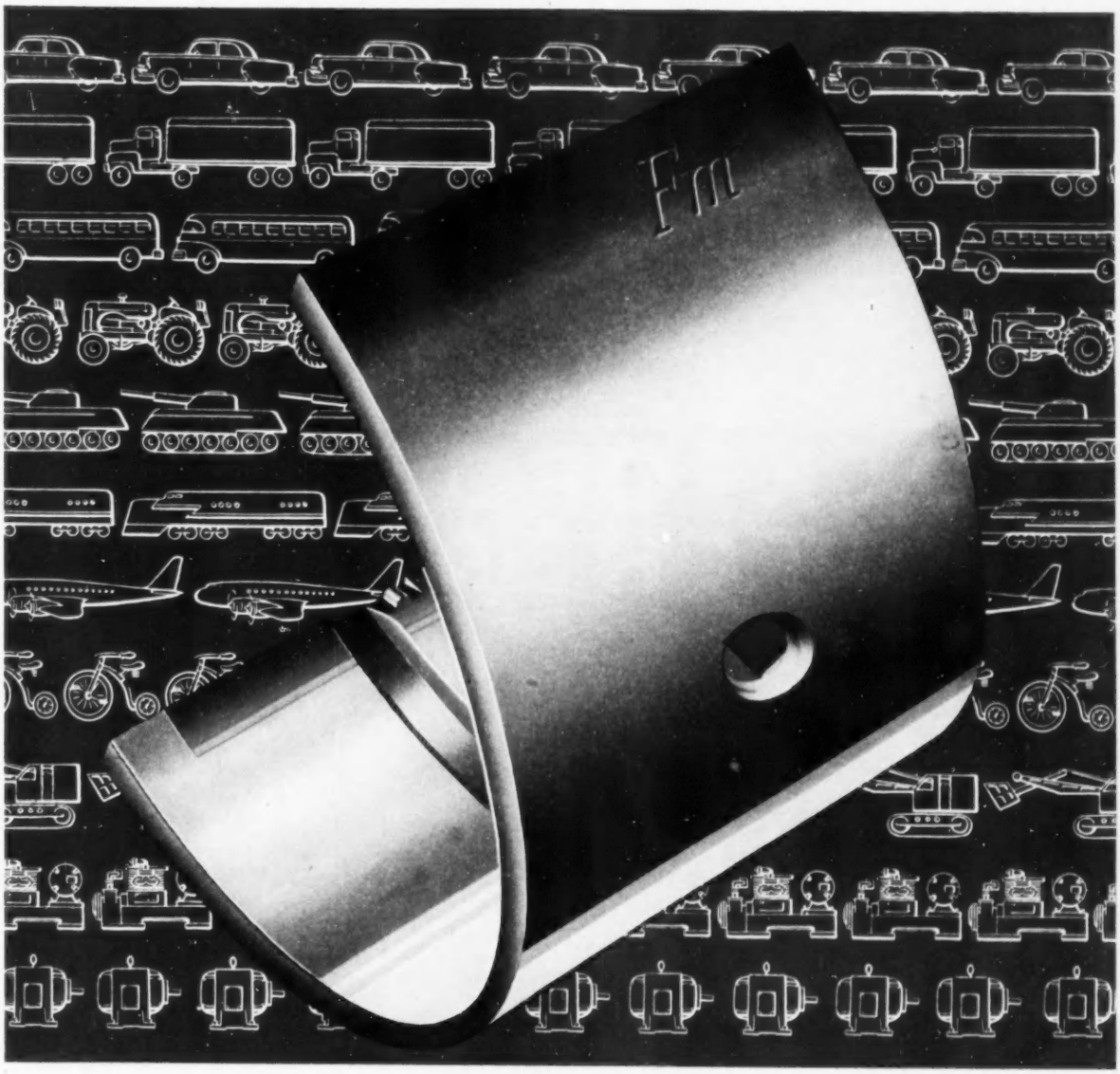
The stretchout in the Air Force B-47 bomber program is said to mean that Bell Aircraft will be producing about $8.5 million less work than it had figured on in the last quarter of 1953. Thus, earnings this year are expected to be about $220,000 less than had been anticipated.

Actually, however, the company stands to gain in the long run because of the stretchout. Bell makes jet engine nacelles for B-47's and had originally figured on being finished with its part of the B-47 program sometime in 1955. Now, due to the stretchout, the work will probably continue into October or November, 1956.

GE Instruments Display Starts on Tour of U. S.

A streamlined exhibit trailer featuring demonstrations and applications of General Electric specialty instruments for increased productivity has begun a year's tour of the U. S.

The traveling exhibit will emphasize applications of instruments in production testing, process and quality control, laboratory analysis, control and analysis of electric utility systems, and measurement for service and maintenance of equipment. About 40 instruments will be available for on-the-spot demonstrations.



A Dependable Service for Over 50 Years

Sleeve bearings in a wide variety of designs and sizes; cast bronze bushings; rolled split-type bushings; bimetal rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.

FEDERAL-MOGUL CORPORATION 11037 Shoemaker • Detroit 13, Michigan

FEDERAL-MOGUL

Industry News

(*Continued from page* 174)

Profit of U. S. Rubber Up Over 13 Per Cent

Net profit of U. S. Rubber Co. increased more than 13 per cent in the first nine months of 1953, while sales advanced 1.3 per cent. Net sales for the nine-month period edged ahead to a new record of $657,393,028, compared with $648,744,964 last year. Net profit was $21,488,326, compared with $18,912,141 for the same 1952 period.

Oil Refining Is Efficient

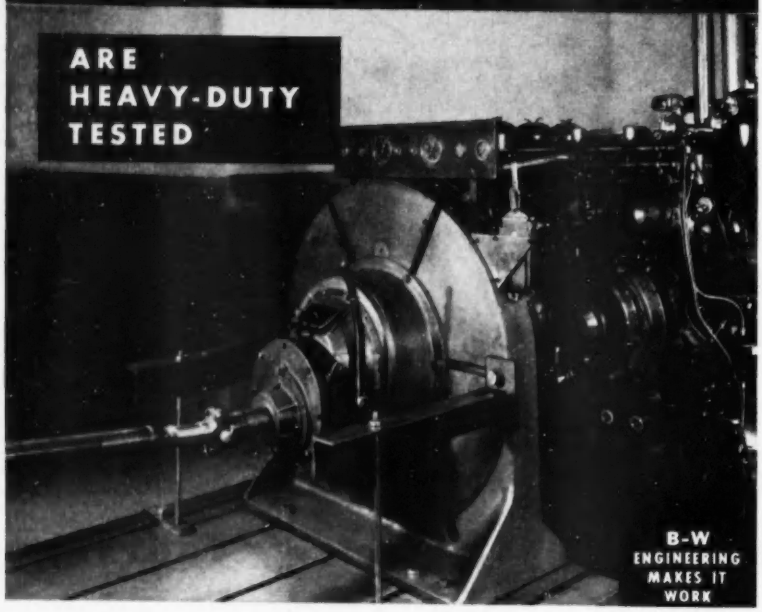
New gasoline refining methods will not result in any waste of the nation's petroleum supplies, according to Eger V. Murphree, president of Standard Oil Development Co., in a recent speech before the SAE.

Mr. Murphree noted an apparently widespread misconception that the production of more and more powerful gasoline helps deplete oil reserves. As an example of such erroneous impressions, he referred to implications in the report of the President's Material Policy Commission, known as the "Paley Report." While praising the over-all content, he said the authors were misinformed in concluding that a great deal of energy is "lost" in producing higher octane number gasoline from crude oil.

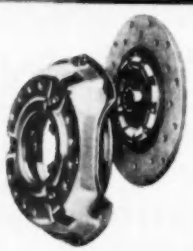
He said it is true that some additional energy in the form of crude oil or fuel is used, but estimated a net gain in energy utilization of six per cent from 1951 to 1956, about 12 per cent by 1961, and up to 25 per cent within the succeeding several years as cars designed for the higher octane number gasoline replace older models.

ROCKFORD CLUTCHES

ARE HEAVY-DUTY TESTED



Large ROCKFORD Clutches, Power Take-Offs and Speed Reducers are tested for torque, engaging pressure, release, temperature, gear strength, bearing endurance and clutch facing wear on this 400 H.P. diesel powered, electric dynamometer. Let ROCKFORD engineers utilize this machine to improve *your* heavy-duty power transmission controls.



B-W PRODUCTION MAKES IT AVAILABLE

ROCKFORD CLUTCH DIVISION BORG-WARNER
315 Catherine Street, Rockford, Illinois, U.S.A.

Martin Matador Is Launched

Push-button warfare drew a step nearer recently when the first U. S. tactical, unmanned weapon, the USAF-Martin B-61 Matador pilotless bomber, took off from a roadable launcher at the Air Force Missile Test Center, Cocoa, Fla. Assigned to the Tactical Air Command, the Matador is now being used for training this country's first pilotless bomber squadrons.

A rocket gives the Matador the thrust necessary to become airborne, after which a turbojet engine takes over to furnish the power.

AWS Re-Elects Plummer to Post of President

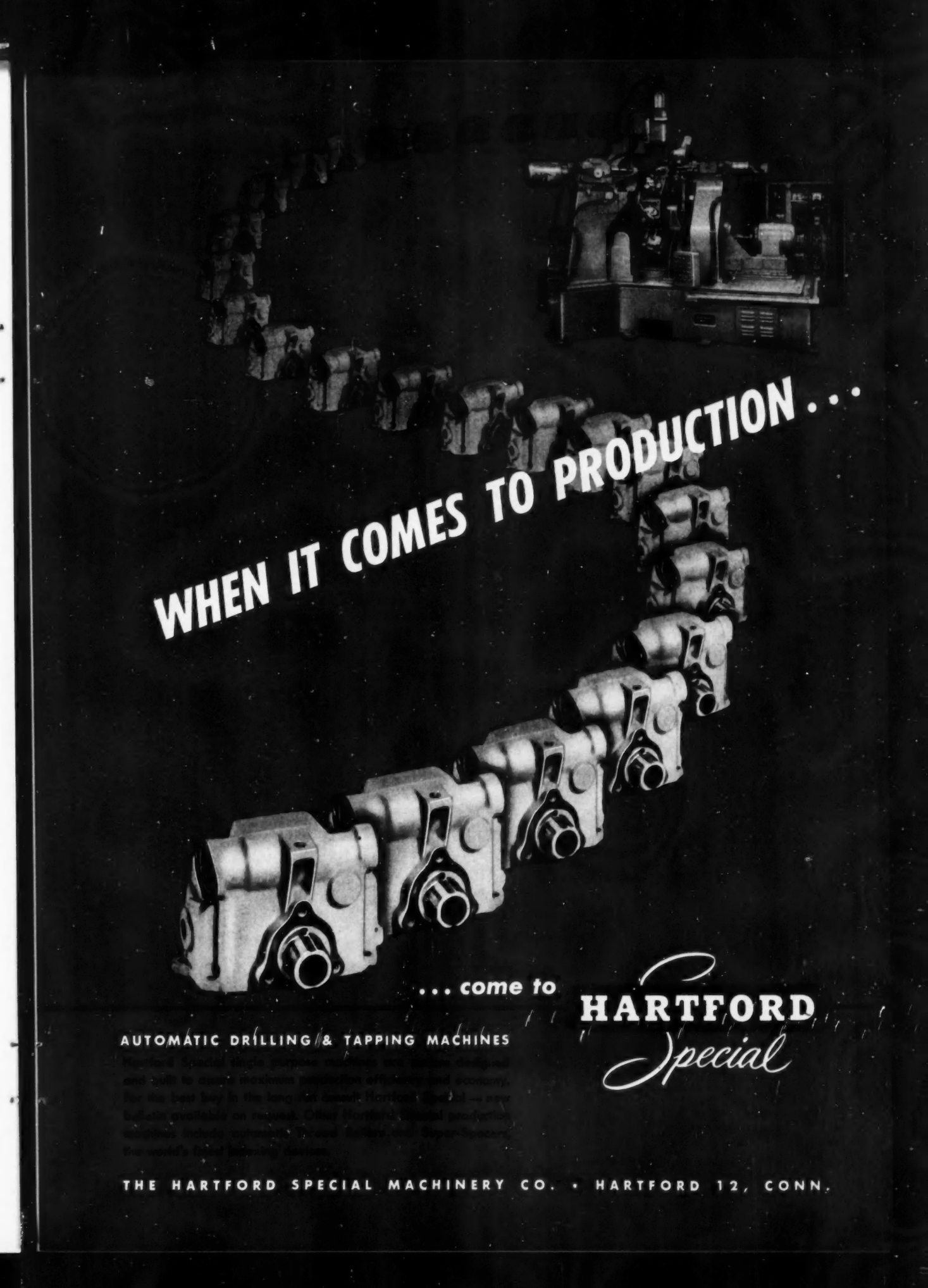
The American Welding Society has re-elected Fred L. Plummer, director of engineering, Hammond Iron Works, as president for 1953-54. Simultaneously, J. H. Humberstone, vice-president of Air Reduction Co., was made first vice-president; J. H. Chyle, director of welding research, A. O. Smith Corp., second vice-president; and Russell S. Donald, president, R. S. Donald, Inc., treasurer.

Price, Candell Elected to SIMPE Positions

Stanley Price, Western Electric Co., and Earl B. Candell, Lamp Div., General Electric Co., have been elected chairman of the board and president, respectively, of the Society of Industrial Packaging and Materials Handling Engineers.

Other officers elected are J. W. McReynolds, executive vice-president; L. S. Beale, A. C. McGeath, and E. P. Troeger, vice-presidents; M. A. Grogel, treasurer; and John Mount secretary.

(*Turn to page* 181, *please*)


WHEN IT COMES TO PRODUCTION . . .
. . . come to
HARTFORD
Special
AUTOMATIC DRILLING & TAPPING MACHINES
THE HARTFORD SPECIAL MACHINERY CO. • HARTFORD 12, CONN.

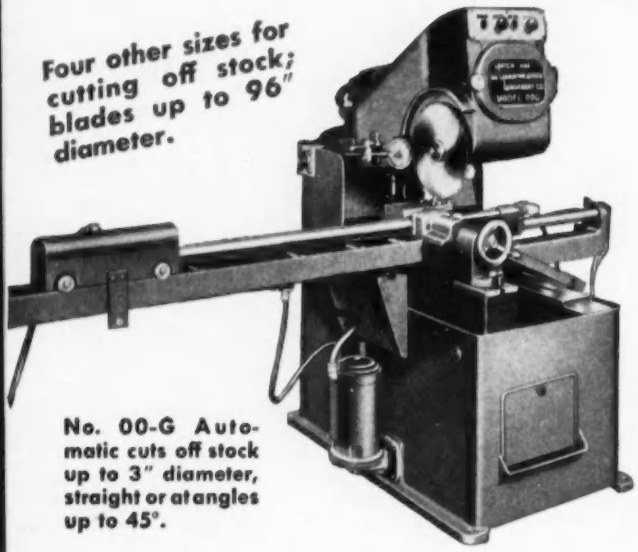
USE ENGINEERING

NO LET-UP. Whether in a war-time or peace-time economy, America's levels of effective production must be sustained and raised. New highs must be reached and surpassed. Constant advances in machine tool purpose and design must promote the nation's industrial progress. To these ends Motch & Merryweather engineering is continuously directed. Typical machines are illustrated here.

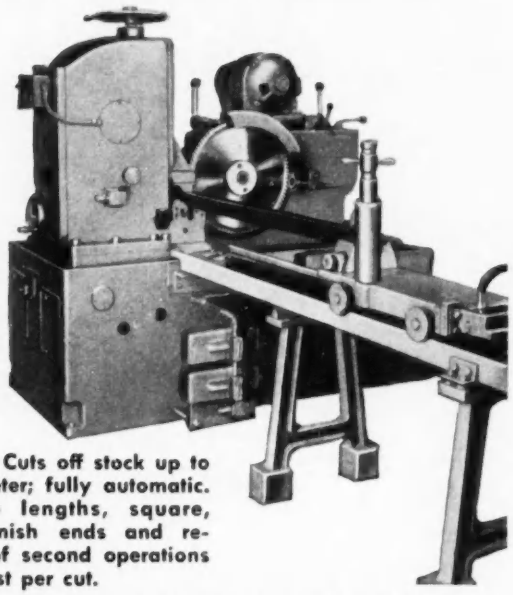
MOTCH & MERRYWEATHER Circular Sawing Machines

to cut off every size and shape of stock, ferrous or non-ferrous.

Four other sizes for cutting off stock; blades up to 96" diameter.



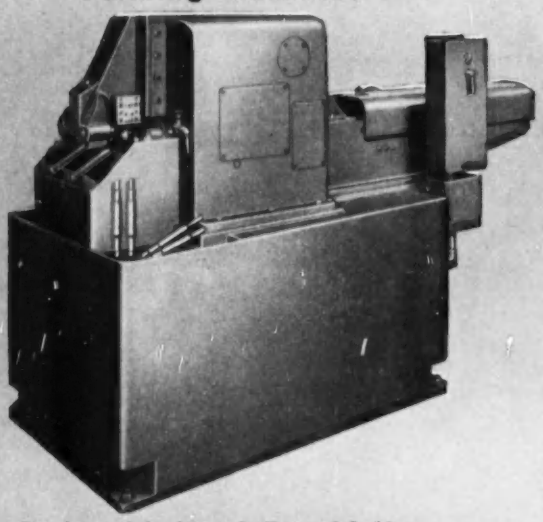
No. 00-G Automatic cuts off stock up to 3" diameter, straight or at angles up to 45°.



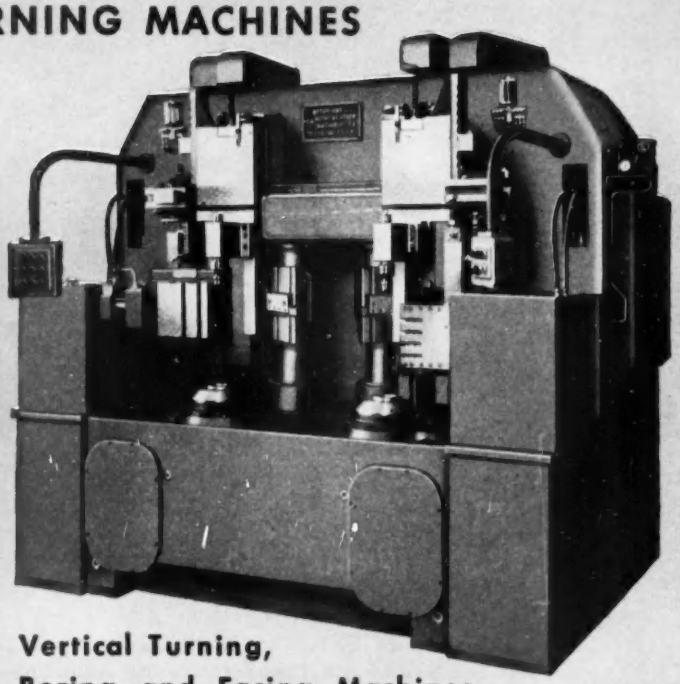
No. 2-A. Cuts off stock up to 6" diameter; fully automatic. Accurate lengths, square, milled finish ends and reduction of second operations lower cost per cut.

Motch & Merryweather TURNING MACHINES

Cam Automatic Forming Machines



Single- and double-spindle models. Hopper loading or bar feeds. All movements actuated by single cam shaft.

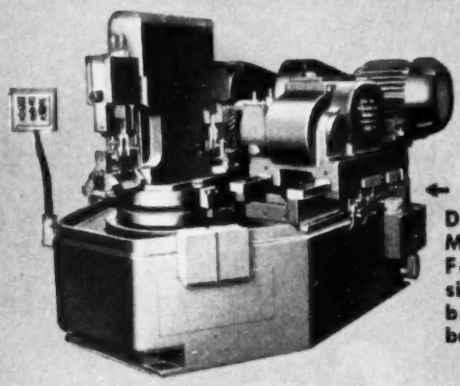


Vertical Turning, Boring and Facing Machines

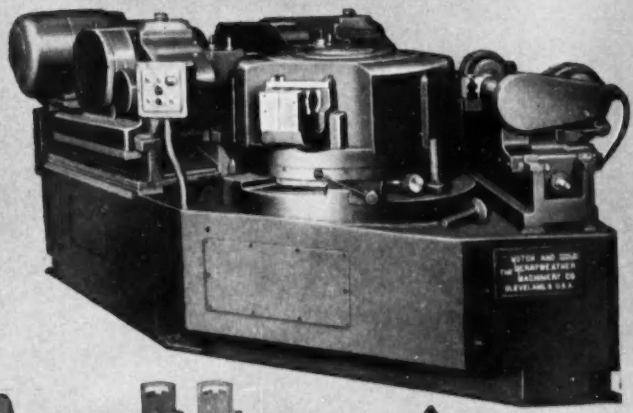
Single- or double-spindle. Multiple tool blocks hydraulically fed with automatic sequence for maximum metal removal.

FOR NEW POTENTIALS IN ADVANCING PRODUCTION

Heavy Duty Production Milling Machines

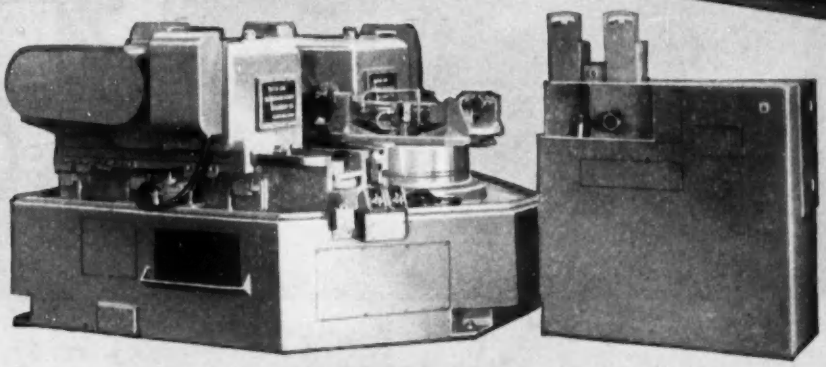


Duplex Production Milling Machine. Face mills both sides of tractor side bars. Up to 268 bars per hour.



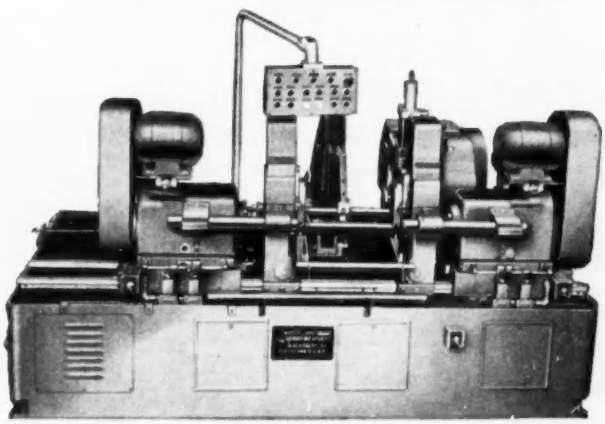
Milling and center drilling unitized. Face mills and center drills both ends of pinion shaft. Up to 230 shafts per hour.

Weight-balance milling machine unitizes weighing and subsequent metal removal. Face mills weight boss on each end of automotive connecting rod. Up to 300 pieces per hour.

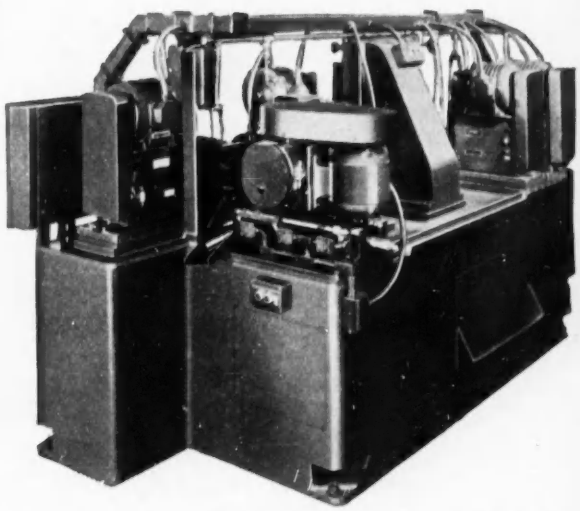


M. & M. TRANSFER MACHINES

for bar stock cut-off and double-end machining, tailored for individual requirements.



Cut-off operation simultaneous with double-end machining. Models for stock ½" through 6" diameter, lengths 8" through 40". Many forms and combinations of double-end machining.



Unusual combination of machining operations in one unit: drill, countersink, broach, cut-off, chamfer.

Manufactured by — THE MOTCH & MERRYWEATHER MACHINERY CO. —
CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

THE LEADERS LOOK TO THE LEADER



EASY WASHERS use C/R Oil Seals

One secret of the outstanding success of the Easy Washing Machine is the special oil used in the gear-case assembly. This lubricant is of so high a quality that it normally lasts for the entire life of the machine.

There can be no doubt, likewise, about the lifetime performance of the oil seal that keeps this fine oil in, and dirt out.

The day-in and day-out utilization of a washing machine over long years of household service is a severe test of all working parts. Easy Spindriers are famous for long and trouble-free performance. A C/R oil seal, with Sirvene synthetic rubber sealing member, guards this smooth functioning at the very heart of the machine —the gear case.

Another example of a leader looking to the leader, for research, engineering and manufacture of the highest type. If you have a particularly tough oil-sealing problem, where failure simply cannot be allowed to occur, put it up to Chicago Rawhide engineers. This sort of thing has been their specialty for 30 years.

C/R oil seals, the most widely used, are stocked in over 1800 sizes covering 16 different types, for immediate delivery. Our booklet, "Engineering with C/R Oil Seals," belongs in your files. Allow us to send it to you, without cost or obligation.

CHICAGO RAWHIDE MANUFACTURING COMPANY

1310 Elston Avenue OIL SEAL DIVISION Chicago 22, Illinois

● ***More automobiles, farm equipment and industrial machines rely on C/R oil seals than on any similar sealing device.***



75 C/R

PERFECT *Oil Seals*

Industry News

(*Continued from page* 176)

GE Sales, Earnings Up in Nine Months

Sales of General Electric Co. for the first nine months of this year totaled $2,341,048,000, an increase of 29 per cent over the same period in 1952. Net earnings for the nine months also increased, rising to $116,386,000, an increase of 23 per cent over the earnings for the corresponding period of 1952 of $94,750,000.

Bendix to Expand Work at Davenport Plant

Bendix Aviation Corp. has announced that it will concentrate an important part of its engineering work on oxygen systems for high-altitude aircraft at its Pioneer-Central Div., Davenport, Ia. The Davenport plant also produces gyro instruments, flight instruments, aircraft fuel measuring devices, and other units.

J. B. Rea Co. Moves to New Building

J. B. Rea Co., Inc., designers and manufacturers of automatic control systems for military weapons and industrial processes, has moved into a new plant at 1723 Cloverfield Blvd., Santa Monica, Calif. It will house, among other facilities, a complete analog and digital computing center.

Propeller Press Plant

Curtiss-Wright Corp., with employment in Buffalo up around the 1800 mark, believes it may be stabilized at about that level.

Meanwhile, the new plant there to house a propeller-making press is 60 per cent complete and is scheduled for completion in December. However, a considerably longer time will be required to get the press installed.

Cadillac Plastic Co. to Make Resin Items

Cadillac Plastic Co. of Detroit has been licensed by E. I. Du Pont de Nemours and Co. to produce cast acrylic resin rods and tubes. Manufacturing facilities purchased from Du Pont are now operating at full capacity in the new Cadco plant, and production for the present will be devoted to rods and tubes with special emphasis on providing a wide range of sizes in greater quantity.

(*Turn to page* 182, *please*)

HOW DID THE *screw* GET ITS NAME?





The word "screw" is supposed to come from the Latin "scrofa" which has been defined as "a digger," from the habit of swine, who are fond of rooting up the earth with their noses. However, at least one man disagrees with the explanation. He figures that the etymologists have picked the wrong end of the pig. To him, the curly tail looks more like a screw than the nose does. Heads or tails, tradition has made the word part of the language.

Today, Allmetal—maker of stainless steel screws, bolts, nuts, and many other stainless fasteners—owes its good name to a tradition of high quality and fast service. If you need anything from our line, just give us the word.

Our 96-page catalog contains engineering data and weights as well as sizes and dimensions of stock items. If you want a copy, send us a note on your letterhead. Ask for catalog 53-X.

STAINLESS FASTENERS

ALLMETAL
SCREW PRODUCTS COMPANY, INC.
821 STEWART AVE., GARDEN CITY, L. I., N. Y.

Industry News

(*Continued from page* 181)

Security Analysts Tour Allegheny-Ludlum Plants

Forty-three security analysts recently completed a two-day tour of three of Allegheny Ludlum Steel Corp's. plants. Their trip covered the principal points of interest in the company's $80 million dollar expansion and improvement program that has been executed since 1946.

Mexican Automobile Plant Represents Big Investment

The automobile plant to be built in Mexico soon with joint Mexican and Italian capital, reportedly will represent an investment of $29.07 million.

The multi-million enterprise will permit Mexico to have her own car assembly plant within three years, it is believed. Under the present set-up, most U. S. cars produced in Mexico today are put together from parts imported into the country.

Private capital will subscribe to 40 per cent of the required investment. The balance will be jointly provided by the Turin Fiat management and the Mexican government.

White Motor Earnings Up from Year Ago

White Motor Co. reports an increase in both sales and earnings for the first nine months of 1953. During the first three quarters of this year, earnings totaled more than $3.1 million, compared with $2.28 million for the same period of last year. Sales also showed an increase to $120.2 million, compared with $114.9 million a year ago.

Fruehauf Trailer Net Shows Gain

Fruehauf Trailer Co. has reported a substantial increase in both sales and earnings for the first nine months of this year. Net increased to more that $5.7 million from $4.2 million in the same period a year ago.

Sales for the nine months of this year jumped to more than $154.3 million from nearly $122 million in the same 1952 period. Nearly $46 million of this year's total was accounted for by defense sales. The company currently has backlogs for military-type trailers totaling approximately $46 million.

Borg-Warner Sales, Earnings Hit Peak

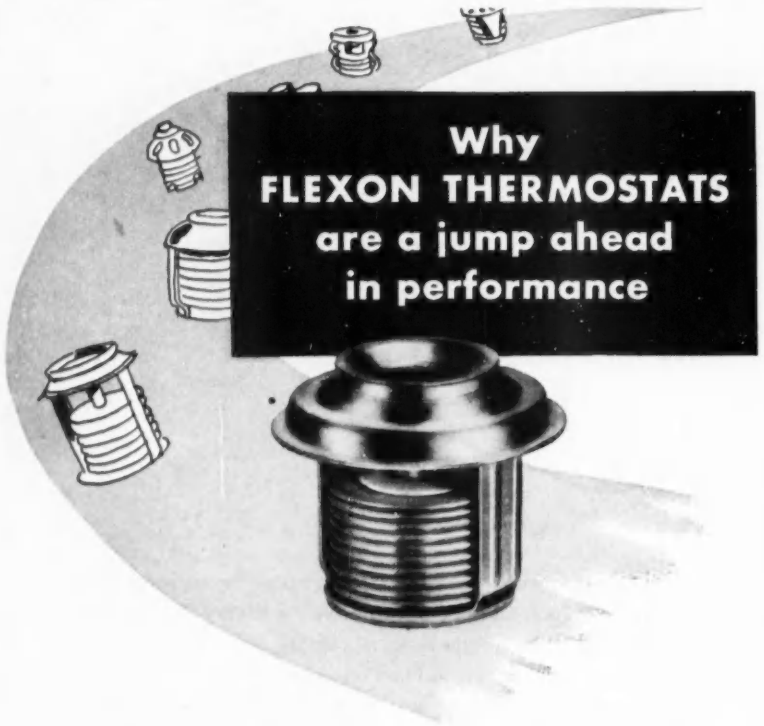
Borg-Warner Corp. reports the highest sales and earnings before taxes for the first nine months of this year of any other similar period in history. Sales totaled $314.97 million and earnings before taxes $45.79 million. Net income after taxes, however, was slightly more than $17 million.

Allis-Chalmers Net Drops 15 Per Cent

Allis-Chalmers Manufacturing Co. reports that earnings for the first nine months of this year dropped nearly 15 per cent below the same period a year ago, despite a slight increase in sales. Net income for the period was about $15.1 million, compared with $17.75 million during the same period a year ago.

Sales for the first three quarters of this year totaled more than $391.1 million compared with $384.6 million a year ago.

(*Turn to page* 184, *please*)



Flexon Thermostats have set new automotive standards for accuracy and dependability because of the Integral Stem Guide. The guide, integral with the top plate, is a structural aligning device that maintains precision centering of the stem and positive seating of the valve, thus assuring trouble-free performance in operation. No other bellows type thermostat offers this feature.

Flexon Thermostats are the quality product of a reputable manufacturer with over 50 years fabricating experience in instrument bellows, precision aircraft components and related items. We would welcome the opportunity to discuss your needs with you and demonstrate what Flexonics Corporation can do for you. Write, wire or phone to have your Flexonics sales engineer call.

Flexonics *Corporation* 1306 S. THIRD AVENUE · MAYWOOD, ILLINOIS

FORMERLY CHICAGO METAL HOSE CORPORATION

Flexon identifies products of Flexonics Corporation that have served industry for over 50 years

Manufacturers of flexible metal hose and conduit, expansion joints, metallic bellows and assemblies of these components.

In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

now stop

doing these jobs by hand!



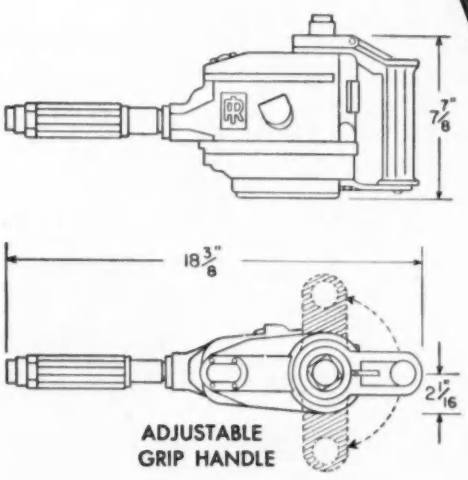
STOP STRAINING on those fifth wheel anchor bolts.

STOP SLUGGING those stubborn wheel nuts

STOP SWEATING over those hard-to-break loose spring U-bolt nuts.

STOP STRUGGLING over all corroded, rusted and frozen nuts.

Size 518 Air Impactool for ¾" bolt size heavy duty jobs. Weight 23½ pounds.



NEW AIR IMPACTOOL makes tough jobs easy!

The new Size 518 is designed particularly for the Automotive Service Industry. It will handle safely and quickly those tough "in-between" jobs – jobs where existing models of Impactools are either too large or too small. The 518 Impactool fits into the tightest places, quickly drives or removes the toughest nuts, with no kick or twist to the operator.

This new Air Impactool is one more addition to a famous line – the world's most complete, versatile, and dependable group of Impactools. Seven sizes of Air and three sizes of Electric Impactools for nut running capacities from ⅜" to 1½" bolt size.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

ORIGINATOR OF IMPACTOOLS • AIR AND ELECTRIC

made by
MASTER CRAFTSMEN
to insure
Matchless Performance

MASTER
SERVICE PARTS



CLUTCH RELEASE BEARINGS

Finest materials and workmanship assure less friction, longer wear.



WATER PUMPS

Lifetime-lubricated bearings. Patented long-life seals. Vacuum-tested.



TIE ROD ENDS

Four ways better! Rolled Threads, Phosphor Bronze Seat, Patented Ball Bearing Construction, Neoprene Washer and Dust Shield.

OTHER MASTER BRAND QUALITY PRODUCTS

Front End Suspension Parts • King Bolt Sets • Front Wheel Bearings
Hydraulic Brake Parts • Hydraulic Brake Hose • Stop Lite Switches
Fuel Pumps Parts and Distributors

MASTER PARTS DIVISION

AIRTEX PRODUCTS INC.
FAIRFIELD, ILLINOIS

Industry News

(*Continued from page* 182)

Trenkamp Reelected to GIFS Presidency

H. J. Trenkamp of Ohio Foundry Co. was reelected president of the Gray Iron Founders' Society at its recent 25th anniversary meeting. Also reelected for another year was W. O. Larson, W. O. Larson Foundry Co., treasurer. C. H. Ker, Dalton Foundries, Inc., and E. G. Huffschmidt, Western Foundry Co., were elected vice-president and secretary, respectively.

Flight Refueling Firm Plans Move to Baltimore

Flight Refueling, Inc., Danbury, Conn., manufacturers of equipment used to refuel bombers and fighters, will move to Baltimore in the near future.

The company, which holds a number of contracts to supply the armed forces with refueling equipment will be located adjacent to Friendship International Airport.

ACF-Brill Sales Up Slightly This Year

Sales of ACF-Brill Motors Co., were somewhat higher in the first nine months of 1953 than in the corresponding period of 1952. Sales for the period amounted to $20,541,899 in 1953, as compared with $15,189,895 in 1952. Earnings for the period were $1,038,785, as against $1,490,977 in 1952.

Rem-Cru Production to Rise Appreciably

Titanium production at the Midland, Pa. plant of Rem-Cru Titanium, Inc., reportedly will increase 300 per cent during the first six months of 1954. Production will be at the rate of 10 ingot-tons of titanium per day, as compared with the present rate of three ingot-tons per day, it was stated.

The company, jointly owned by Remington Arms Co., Inc., and Crucible Steel Co. of America, produces titanium in finished form, such as plate, sheet, strip, and bars. Further expansion is expected to reach into commercial as well as military applications.

(*Turn to page* 187, *please*)

ACCO products CHECK

☐ Shaped Wire*

— Flat
● Round
▬ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ Armature Banding Wire

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

☐ Lock Safety Wire

Tough, durable, workable. In the size and type for your work.

☐ Spring Wire

Any shape* . . . high carbon . . hard drawn . . . high tensile . . . stainless . . . galvanized . . . tinned . . . bright.

*Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

YOU do this—
Give us the specifications of the wire you need—or tell us details of job to be done.

WE'LL do this—
Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

Wire or Write Today

PAGE WIRE

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

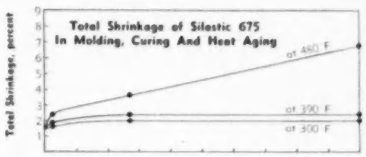
DOW CORNING

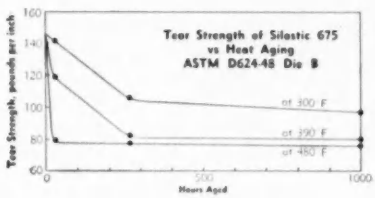
Silicone News

No. 3 of a Series • PUBLISHED BY DOW CORNING CORPORATION, MIDLAND, MICHIGAN

Remarkably Low Compression Set And Low Shrinkage Characterize New Extreme Temperature Silastic*

Silastic 675, a newly developed molding stock, has a combination of properties that is unique even among silicone rubbers. Serviceable from —100 to 500 F, Silastic 675 exhibits the lowest compression set of any extreme temperature silicone rubber. After 22 hours at 300 F, for example, compression set of this new molding stock is in the range of 15 to 20%; after 70 hours, 20 to 28%.





Silastic 675 is well suited for use in applications where low shrink in service is essential. Total shrinkage of molded test samples is below 2.5% after 1000 hours at 400 F; less than 7% after 1000 hours at 480 F. This low shrinkage characteristic also makes it possible to fabricate parts for many applications in the same molds used to form conventional organic rubber stocks.

Silastic 675 also has good dielectric properties. Dielectric strength is 550 volts per mil. Measured at 10^2 cycles, dielectric constant is 3.07 and power factor is 0.0032. After seven days at 25 C and 100 percent humidity, surface resistivity of Silastic 675 is 2.82 at 10^{13} ohms and volume resistivity is 8.58 x 10^{13} ohms.

In addition to its low set, low shrink and excellent dielectric properties, Silastic 675 contains no toxic additives. It can safely be used to fabricate parts which come in contact with cosmetics, food and pharmaceuticals.

Silastic 675 is therefore singularly well suited to the fabrication of resilient gaskets, seals, O-rings, bellows, switch boots and dielectric fittings and connectors. It is one of the most versatile silicone rubber stocks available. It also opens new markets that have been inadequately supplied with parts molded of either organic or silicone rubber stocks.

No. 22

* T. M. REG. U. S. PAT. OFF.



WORLD'S LARGEST UTILITY COMPANY SPECIFIES SILICONE (CLASS H) INSULATION FOR RELIABILITY

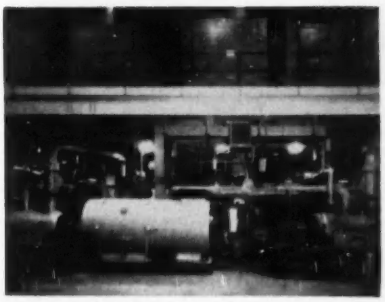
When millions of customers depend on you for 24 hour a day service, you can't take chances with your equipment. That's why the Consolidated Edison Company of New York took action when a 350 hp Class A insulated sluice pump motor failed three times in one year.

Although repeated overloading was the primary cause of failure, ambient temperatures were kept high by an enclosure built around the motor for flood protection. Failure rate was cut to once a year by rewinding with Class B insulation. The motor was then rebuilt with Class H insulation made with Dow Corning silicones. That was 9 years ago, and it is still in service.

That was Consolidated Edison's first experience with Class H insulation. Since then, many other motors have been rewound with Class H to withstand tough operating conditions. Over 79% or 71,700 out of a total of 90,500 horsepower in new motors bought for major auxiliary installations have been Class H insulated.

In buying new Class H equipment, they found that the frame size of motors rated at 200 hp or more could be reduced to such an extent that manufacturing economies often resulted in getting the added life and reliability of Class H insulation at no increase in total cost. Many solenoid coils and replacement coils for motors are also insulated with Class H materials.

Consolidated Edison has also pioneered the use of Class H insulation in sealed dry-type unit substation transformers.



They estimate that the cost of such units is more than competitive with conventional installations for power plant auxiliary supply. Convenient and safe, the Class H transformers can be located almost anywhere. And the cost of cable, switchgear, fire protection and related equipment is greatly reduced. That's why Consolidated Edison has already bought eighty-one 1250 KVA Class H transformers for unit substation work, and twelve 1000 KVA units for miscellaneous light and power.

(continued pg. 2)

(ADVERTISEMENT)

FOR DATA RELATING TO THESE ARTICLES, CIRCLE REFERENCE NUMBER IN COUPON ON NEXT PAGE

MORE

DOW CORNING Silicone News

NEW DEVELOPMENT AND TECHNICAL DATA

For copies of any of the publications reviewed in this column or for data relating to any of the articles printed in this issue of the Dow Corning Silicone News, simply circle the corresponding reference number on the coupon below.

New pressure sensitive adhesives that stick to almost any material remain serviceable and can be applied at temperatures from —67 to 480 F. Uses include bonding silicone treated electrical insulating materials, sealing and wrapping tapes and assembly of small electronic parts prior to mechanical installation. *No. 25*

●

A reprint from Precision Metal Molding magazine describes various applications of silicone die lubricants in metal fabricating. Article includes information on effectiveness, concentrations used and methods of application. *No. 26*

●

Heat-stable, nonflammable, foamed structures can be produced from two new Dow Corning expansible resins. Such structures resist direct flame and thermal shock; undergo practically no structural or dimensional change at 700 F; show less than 0.05 percent moisture absorption after 7 days at 96 percent relative humidity. Both resins can be expanded to densities of 6 to 24 pounds per cubic foot. *No. 27*

●

Leather footwear, linemen's belts and gloves, and sporting goods, treated with Dow Corning 1109, remain water repellent for long periods of time; show greater resistance to oils and many chemicals. Silicone water repellent treatment does not impair "breathing" characteristics of leather. *No. 28*

●

Over 80 rubber companies, ready to make Silastic parts to your specification, are included in a revised listing of Silastic Fabricators. *No. 29*

●

For dependable service under the severe operating conditions frequently encountered in power distribution, welding and electronic applications, Class H transformers may be obtained from the companies included in the list of nearly 100 manufacturers of Class H Transformers. *No. 30*

●

"Tall Tales and Fabulous Facts" is a new 24-page booklet in which a parallel is drawn between the tall tales our ancestors told about such legendary characters as Paul Bunyan, Davy Crockett and Pecos Bill and some of the equally fabulous facts about Dow Corning silicone products. *No. 31*

DOW CORNING CORPORATION - Dept. CI-11
Midland, Michigan

Please send me: 22 23 24 25 26 27 28 29 30 31

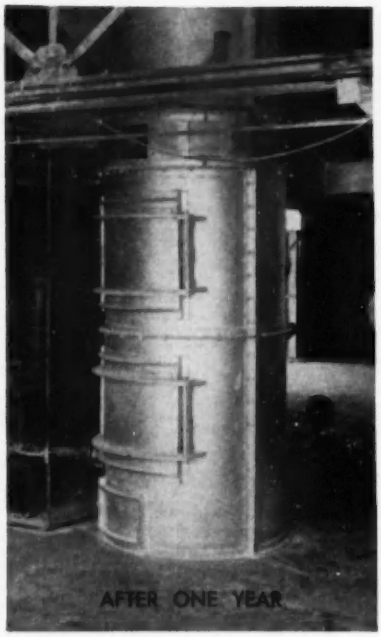
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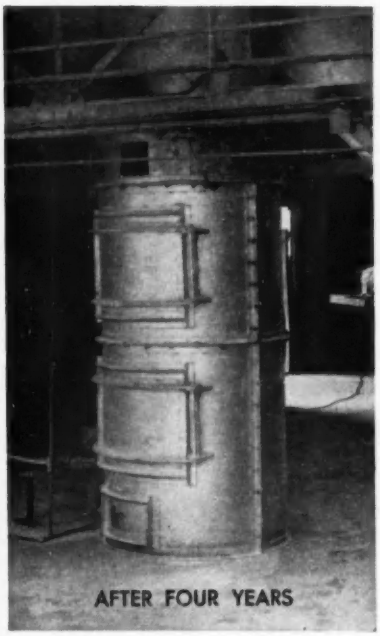
TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ____ STATE _____





Silicone Aluminum Finish On Cyclone Furnace Intact After 4 Years At Temperatures From 70 to 1400 F

In the manufacture of perlite, a lightweight plaster aggregate, Panacalite Pacific Inc., of Los Angeles expands crushed volcanic rock in a cyclone furnace. Originally the furnace stood outside, exposed to the weather. Four times a day it was charged, raising its surface temperature from 70 F to 1400 F.

Three different attempts were made to protect the furnace with aluminum pigmented organic paints. Each application failed completely in a few hours.

Then in December, 1949, the furnace and its hopper were sandblasted, treated with a phosphoric solution and painted with a silicone-aluminum finish, Dutch Boy No. 5542, formulated by the Pacific Coast Branch of the National Lead Company. Exposed to the weather for a year, including rain which fell when the surface was at peak temperature, the finish was still in excellent condition when a building was erected around the furnace and the photo at left was taken.

The second photograph was taken 3 years after the building was constructed. No repainting or other maintenance has been done to date. After 4 years service, the silicone based finish has suffered no visible deterioration or loss of film continuity. *No. 23*

CLASS H RELIABILITY *continued*

That's the attitude that a steadily increasing number of engineers and management men are taking toward Class H insulation made with Dow Corning silicones. Used to uprate equipment by as much as 50% or extend its service life more than 10 times, Class H gives maximum efficiency and maximum reliability at surprisingly little more cost than the next best class of insulation. *No. 24*

First in Silicones

DOW CORNING CORPORATION

MIDLAND, MICHIGAN

Atlanta
Chicago
Cleveland
Dallas
Detroit
Los Angeles
New York
Washington, D. C.
(SILVER SPRING, MD.)

In Canada: Fiberglas Canada Ltd., Toronto
In England: Midland Silicones Ltd., London

Manufacturers of
Silicone Fluids
Silicone Abhesives
Silicone Adhesives
Silicone Release Agents
Silicone Compounds
Silicone Greases
Silicone Water Repellents
Silicone Bonding Resins
Silicone Electrical Insulating Resins
Silicone Molding Compounds
Silicone Expansible Resins
Silicone Defoamers
Silastic

Industry News

(*Continued from page* 184)

Bohn to Give Up Air Force Plant

Bohn Aluminum & Brass Corp. will halt operations at the large Air Force plant at Adrian, Mich., which it has operated during the past two years. Reasons for the decision to abandon the plant were given as an uncertain fuel gas supply and the inability to obtain from the Air Force a contract that would make long-range planning possible.

Tube Reducing Corp. to Open N. J. Plant

Capacity for manufacturing both military items and civilian materials will be provided in a $10.5 million aircraft tubing plant to be operated by Tube Reducing Corp. in Wallington, N. J.

Designed as a naval industrial facility, the plant is scheduled for completion early next year. It will have have a floor area of 96,000 sq ft.

High Court Refuses Review of K-F Case

The Supreme Court has, in effect, upheld a 1949 settlement of a stockholder's suit against Henry J. Kaiser and several associates by refusing to review the case. Under the out-of-court settlement, the group agreed to pay $1.3 million into the Kaiser-Frazer Corp. treasury.

Although it had been charged that the Kaiser interests used company funds irregularly to buy K-F stock in 1948, the Court, in approving the settlement, said there was no finding of fraud, collusion, or attempt to benefit at the expense of Kaiser-Frazer.

Great Lakes Steel Capacity Doubled

Great Lakes Steel Corp., largest subsidiary of National Steel, will have an annual capacity of four million ingot tons by Dec. 1, one month ahead of scheduled completion of its multi-million dollar expansion program. Annual output will be twice the two-million ton capacity in effect in 1946.

About half the four-million ton annual output will be cold-rolled capacity and will provide about 35 per cent of the requirements of the automobile industry.

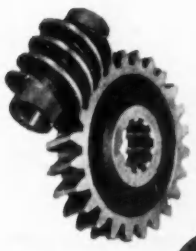
Here's why it PAYS to use . . .











GEARS made by FAIRFIELD

MASS PRODUCTION ECONOMY— Large or small, you get the benefits of high production rates and big volume output at FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!

QUALITY PLUS—There is no finer recommendation for the quality of the product you sell than to be able to say that it is "EQUIPPED WITH FAIRFIELD GEARS!"

DEPENDABLE SOURCE OF SUPPLY— Supplier of precision-made, automotive type gears for over thirty years to leading builders of construction, agricultural, industrial, marine, and automotive equipment.

COMPLETE PRODUCTION FACILITIES—Unexcelled facilities in a new and ultramodern plant for producing Spur, Herringbone, Spiral Bevel, Straight Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.

ENGINEERING SERVICE — Fairfield engineers are qualified to make expert recommendations on your gear production requirements. Take advantage of the service offered. *Your inquiry will receive prompt attention.*

FAIRFIELD MANUFACTURING CO.

2303 So. Concord Road
LAFAYETTE,
INDIANA

For FINE GEARS

New Production EQUIPMENT

(*Continued from page* 70)

Air Connector

A compact, quick detachable air connection, said to provide almost complete free flow of air to air-powered tools, is now in quantity production. The Q-D connection is said to hold pressure drop at the connection to five per cent. Other advantages claimed by the manufacturer include full 360-deg swivel action. *Binks Mfg. Co.*

Circle 88 on page 73 for more data

Abrasive Belt

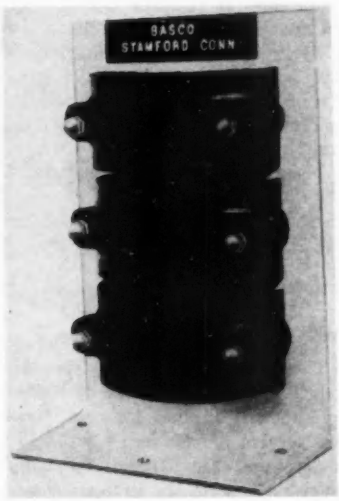
A heavy-coated abrasive belt is to be sold under the trade name "Three-M-ite" Multicut cloth belt.

The heavy mineral build-up of the "Three-M-ite" Multicut belt opens up under work pressure, presenting fresh abrasive grain particles to the work piece. It eliminates the cost and need for making hand coated set-up products. The new belt is available in grit 60 and grit 150 aluminum oxide mineral in all standard widths and lengths. *Minnesota Mining and Manufacturing Co.*

Circle 89 on page 73 for more data

Steel Sheet Separator

Employing the magnetic principle that like poles repel one another, a device which automatically separates steel sheets of any shape is now available. The unit comprises a permanent maget that induces a magnetic field in the stacked steel sheets which



tend to repel each other, causing the ends of the sheets to fan out with air space between them.

The separator will "float" each sheet to enable operators to feed presses, brakes, shears, and other metal fabricating machinery. It will handle round and odd shaped sheets, as well as straight edges.

The unit is available in four standard models to handle sheets of 20 gage and lighter to heavier sheets than 12 gage. *Basco Manufacturing Co.*

Circle 90 on page 73 for more data

Copying Machine

Copyflex Model 15, for desk-side copying produces black-on-white diazotype copy of an office form or report from a large accounting work sheet down to a letter, an invoice or memo. It can copy a sheet up to 20 in. wide

(*Turn to page* 190, *please*)

CUT COSTS . . . FASTEN "ON THE DOUBLE" with the Chicago "214" DOUBLE RIVET SETTER



The "214" automatically feeds, inserts and clinches two rivets at a time . . . with speed that may mean a big saving in your fastening costs. 14" throat makes large assemblies easy to handle. For up to 9/64" diameter steel rivets — lengths to 7/8". Quick Change Rotary Type Hoppers and Raceways permit a 5-minute changeover to rivets of different size. Adjustable anvils and riveting centers add to its versatility. Ask us how the "214" can help you cut costs. Send a sample of problem assembly (or blue print) for Free fastening analysis.

FREE CATALOG

contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.

9612 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois

Branch Factory: Tyrone, Pa.

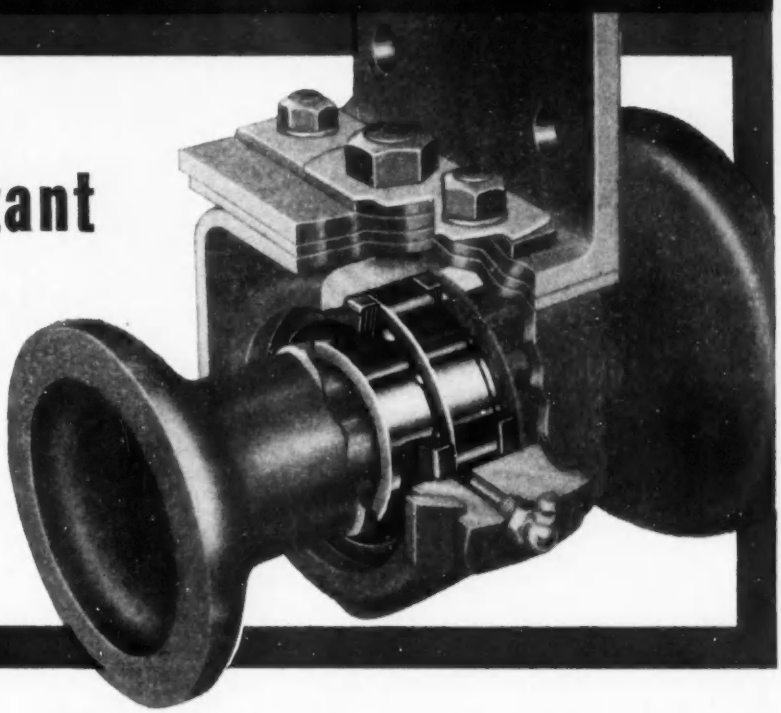


John Deere-Killefer, 1200 Series, Hydraulically Controlled Offset Disk Harrow, Fafnir Ball Bearing equipped.



John Deere-Killefer, 180A Series, 4 Gang Disk Harrow, Fafnir equipped.

An important role in low-cost disking



On John Deere-Killefer disk harrows, Fafnir Wide Inner Ring Ball Bearings are playing an important role in the achievement of low-cost, trouble-free disking operations. Besides reducing friction with a resultant extension of service life, these bearings make possible a more compact housing which provides extra clearance below the spools to allow dirt, trash and cover crops to pass through without dragging on the bearing. They put lubrication on a once-a-season basis . . . equipment is ready to use instantly. Their rugged construction withstands greater shock loads. Triple seals make them impervious to dirt and moisture.

More and more farm machinery is being equipped with Fafnir Ball Bearings for several basic reasons . . . breadth of line, uniformly-high quality standards, ease of installation, high efficiency of seals and shields, to mention a few. Equally important is the Fafnir "attitude and aptitude" . . . a way of looking at bearing problems from the designer's viewpoint, and an ability to provide the precise bearing to fit the need. Maybe these Fafnir attributes can help you solve a bearing problem most effectively. The Fafnir Bearing Company, New Britain, Connecticut.

FAFNIR
BALL BEARINGS

MOST COMPLETE LINE IN AMERICA



Model CF Truck-Type Torque Converters (shown) are designed for short, steep hauls; Model DF (with lock-out feature providing direct mechanical drive) for hauls with alternate flats and grades. Ask for Bulletin No. 501.

- BIGGER LOADS
- FASTER TRIPS
- LONGER EQUIPMENT LIFE
- LESS DOWN TIME



IRON MINE

DART: "Average 23 ton payloads, on grades up to 15%; have increased the number of runs per day . . . held down engine, drive line and brake overhaul . . . certainly well satisfied with the performance of our 14 Twin Disc Torque Converter-equipped trucks."

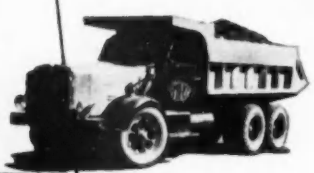
LOG HAULER

PETERBILT: "With up to 110 tons GVW, 42 mile trip cut to less than 2 hours; Hydro-dynamic braking feature virtually eliminates pedal braking; up-to-6:1 multiplication eliminates engine lugging and load shocks on starting . . . wear on engines, transmissions, final drives, brakes and tires greatly reduced . . . entire fleet now has Twin Disc Truck-Type Torque Converters."



COAL MINE

INTERNATIONAL: "18 ton payloads (GVW 31 tons) and more trips per day; 2/3 mile on 3% grade in fourth (1:1) and final 1/3 mile on 10% grade in third (1:38:1) . . . makes speed of 8 mph on 10% grade. Repair and replacement of engine and drive units have been reduced. Operation much easier . . . and safer."



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

TWIN DISC CLUTCH COMPANY Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

New Production EQUIPMENT

(*Continued from page* 188)

by any length and handles ordinary size forms two at a time.

The Model 15 operates on 230 volt a-c, 60 cycle, electric current. The additional power utilized by the Model 15 enables it to achieve a 50 per cent higher copying speed. *Charles Bruning Co.*

Circle 91 on page 73 for more data

Hydraulic Hone



A hydraulic honing machine claims an improved process for the liquid-abrasive cleaning and polishing of all metal parts. An automatic drain promises a 300 per cent faster changeover from one abrasive to another. An increase in illumination to 1200 watts and a new blower system that completely changes interior air every three seconds, are other features.

A special pump eliminates packings and also allows the abrasive carrying fluid to by-pass all bearings. (Hydro-Hone Mfg. Co.)

Circle 92 on page 73 for more data

Transfer Mechanism

A special transfer mechanism has been developed to index, advance and unload 22-lb brake drums through a 600-ton coining press.

The press attendant is required only to place the drums in the preload position; subsequent operations are automatic. Previously, in order to locate the drums properly in the die, the operator had to place his hand

(*Turn to page* 194, *please*)

Johnson

ALUMINUM-ON-STEEL BEARINGS...



a new type for internal combustion engines

TODAY'S AUTOMOTIVE DESIGN TRENDS call for more horsepower, which places a demand for higher load capacity on the bearings. Johnson Aluminum-on-Steel Bearings offer a possibility to meet this demand. They combine some of the properties of babbitts-on-steel with those of the higher strength alloys, to permit bearing loads up to 5,000 P.S.I. They offer good conformability, good resistance to shaft wear, good corrosion resistance, adequate seizure resistance and good resistance to fatigue. Johnson Aluminum-on-Steel Bearings are roll bonded, and tests prove that the bond to the steel back is as strong as the metal itself. They have been highly successful in diesel engines. They promise to become the high load bearings of the future. Write for full information.

JOHNSON BRONZE COMPANY
625 South Mill Street • New Castle, Pa.

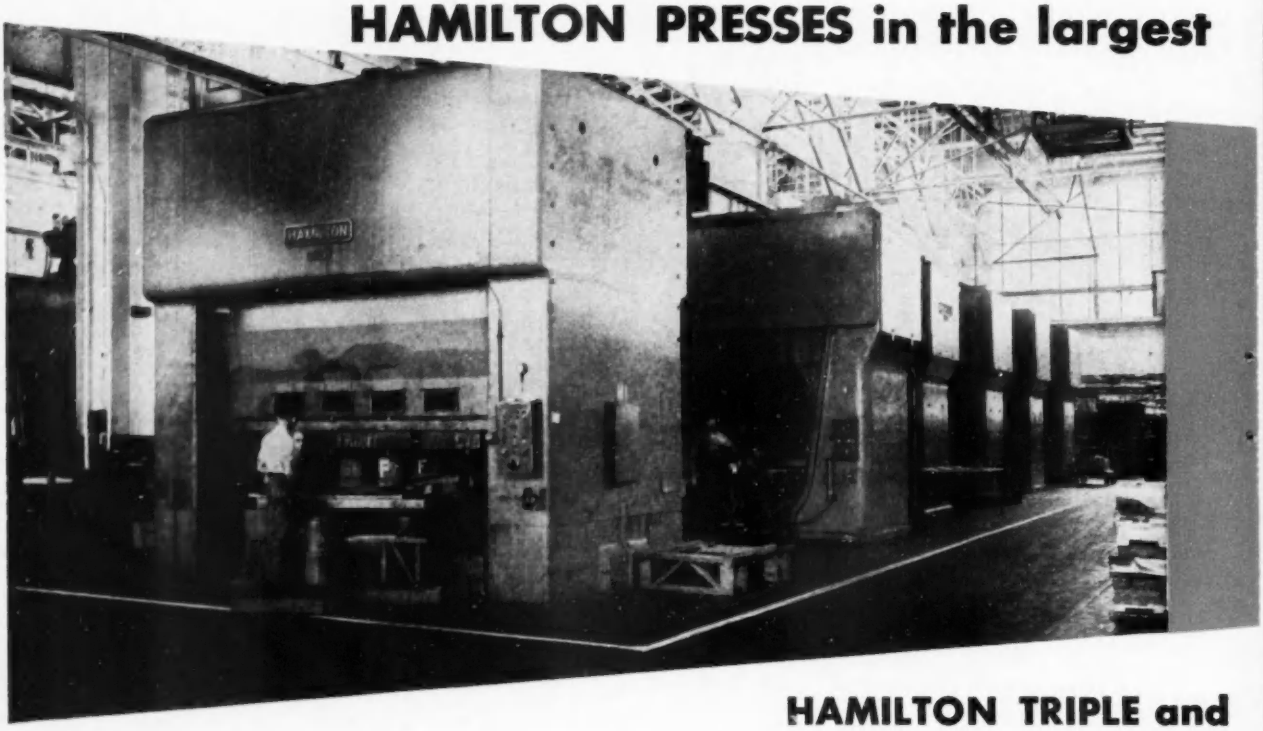
JOHNSON JB BEARINGS
Sleeve Type

Sleeve Bearing Headquarters Since 1901

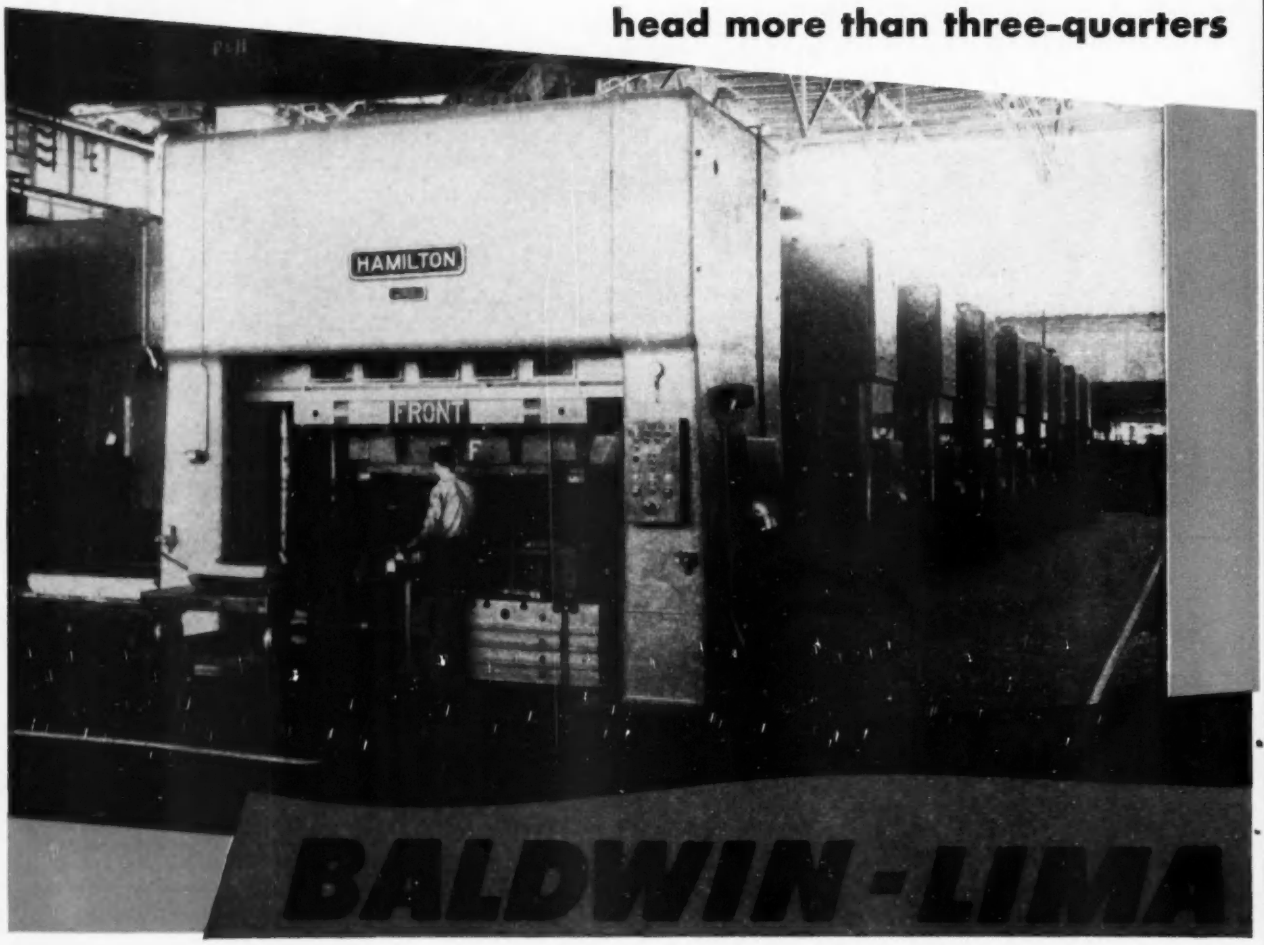
JOHNSON BRONZE PRODUCES ALL TYPES OF SLEEVE BEARINGS:

BRONZE-ON-STEEL, copper lead • STEEL BACK, babbitt lined • BRONZE BACK, babbitt lined • CAST BRONZE, plain or graphited • SHEET BRONZE, plain or graphited • CAST ALUMINUM ALLOY • ALUMINUM-ON-STEEL • LEDALOYL powder metallurgy

HAMILTON PRESSES in the largest

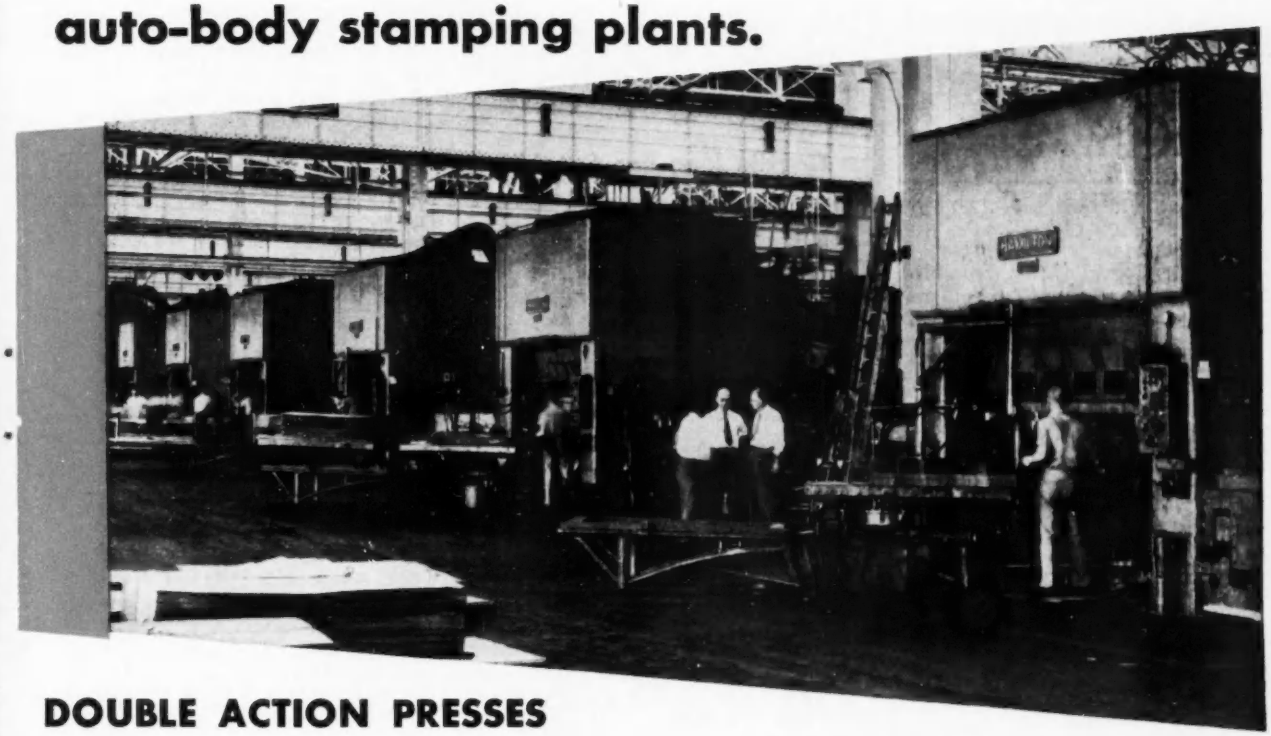


HAMILTON TRIPLE and
head more than three-quarters



BALDWIN-LIMA

auto-body stamping plants.



DOUBLE ACTION PRESSES
of the master production lines.

HAMILTON PRESSES

HAMILTON PRESS DIVISION
CURTIS BUILDING, DETROIT 2, MICHIGAN
Branch Offices: NEW YORK, CHICAGO
Factory: HAMILTON, OHIO

BALDWIN
BLH
LIMA-HAMILTON

-HAMILTON

New Production EQUIPMENT

(*Continued from page* 190)

beneath the punch. Aside from its inherent safety value, the mechanism enables users to utilize the full production capacity of the press.

Developed originally for a leading automobile manufacturer, the basic design is said to be applicable to a wide range of feeding and unloading applications. *Sahlin Engineering Co.*

Circle 93 on page 73 for more data

Ductile Iron Bar Stock

A new engineering material, ductile iron bar stock, is now in production. Center-line shrinkage reportedly is overcome, and the foundry says it is producing bars that are sound from one end to the other and will pass X-ray inspection for density. Bars are supplied in 12 in. lengths in round sizes of 1¼ in., 1¾ in., 2¼ in., 2¾ in., 3⅜ in., 4⅜ in. and 6 in.

The as-cast average properties of ductile iron bars are 100,000 psi tensile strength, 65,000 psi yield, 3½-4½ per cent elongation and 245 Brinell hardness. Bars can be heat treated for greater elongation and hardness.

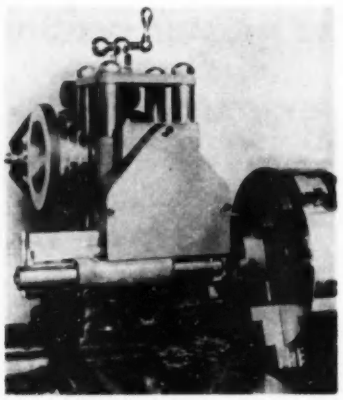
Ductile iron bars already are being used by aircraft plants to provide a satisfactory material with as-cast elongation. Intricate, thin oil pump bodies and covers for use in jet engines are being machined out of the bars. *Howard Foundry Co.*

Circle 94 on page 73 for more data

Keyseater

An internal keyseater, slotter and shaper is now on the market.

The keyseater adds reciprocating tool action to a wide range of precision machining which the maker has offered. It permits use as a portable independent tool, which can be taken to the work. The machine will cut internal keyways from ⅛ in. to one

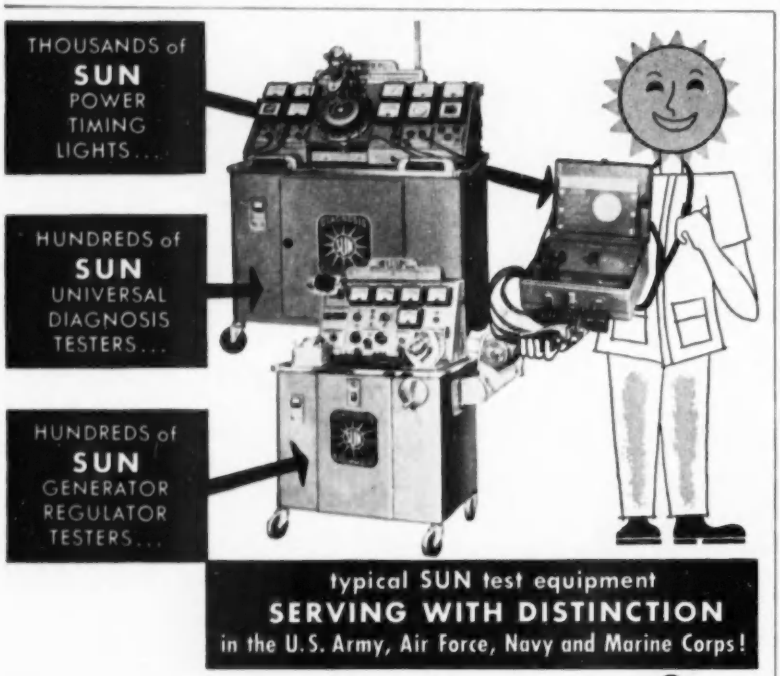


in. in width, in bores from ½ in. diameter to any required size. It can be set on a lathe carriage, so that the keyway may be cut in the same set-up in which a hub is bored. It may also be used as a portable slotter or shaper, and as a bench shaper.

Stroke is adjustable from zero in. to five in. in length, and a full 360 deg in angle. Interchangeable tool heads provide "clapper" action.

An oil reservoir provides automatic lubrication for every rotating and sliding surface. The dovetail slide, which guides the stroke, is adjusted for fit by a tapered gib. The rocker arm and all tool holders are hardened steel. The tool bar is carburized, hardened, and ground on outer surface and tapered socket for tool holders.

(*Turn to page* 198, *please*)



typical SUN test equipment
SERVING WITH DISTINCTION
in the U.S. Army, Air Force, Navy and Marine Corps!

industry's leaders, too, depend on Sun

...for special order, built to specification scientific test equipment...

SUN Electric Corporation is the world's largest manufacturer of Automotive and Aircraft Electrical and Electronic Testing Equipment supplying approximately 70% of the testing equipment of this type to U.S. automotive dealers. Leaders in every branch of the industry and important branches of the armed forces, look to SUN to design and build special scientific test equipment to meet their needs. SUN general and special-order units are in use in car, truck and tractor factories, aircraft and ordnance plants, and in the factories of component parts manufacturers everywhere. Let SUN Engineers show how you can cut operating costs and eliminate production headaches with simplified high speed production testing, spot checking and quality control of materials with SUN Equipment!

DON'T GUESS - TEST!

Write TODAY for the SUN SPECIAL TEST EQUIPMENT Catalog!
SUN *Equipment is available in 6-12-24 volt units.*



Sun ELECTRIC CORPORATION
6373 AVONDALE AVE., CHICAGO 31, ILLINOIS

give the GO-signal to DETREX for guaranteed metal cleaning



Only Detrex provides BOTH the chemicals and the equipment to do your metal cleaning operations. The benefits are obvious.

Through coordination of thinking in one competent organization, the most economical combination of equipment and chemicals can be achieved . . . considering both initial and operating costs. These results are guaranteed!

Whether solvent degreasing, alkaline or emulsion washing or even cleaning with sound waves is required, Detrex produces all the basic components . . . recommendations are not biased . . . quality control is complete.

Once installed, Detrex field engineers keep a watchful eye on the operation to assure top efficiency as long as you run the operation. They'll even train your operators.

It all adds up to team play from start to finish and that's a winning combination in any league. It's the very reason that statistics prove manufacturers, from coast to coast, prefer Detrex for their complete cleaning needs by two-to-one. You can get the whole story by spending a minute to fill out and mail the coupon at the left . . . we're confident it will pay you to do it.

for free survey

At no obligation to you, the Detrex field man in your area will come in and survey your present or proposed operations. There is no cost for the service. The result will prove to you the money-saving advantages of Detrex service. Just fill out and mail the coupon below . . . our field man will call you for the most convenient time to come in.

DETREX CORPORATION,
DEPT. 404, BOX 501,
DETROIT 32, MICHIGAN

Please have the Detrex man in our area make an appointment to survey our operations to point up ways of cutting cleaning costs.

NAME .....

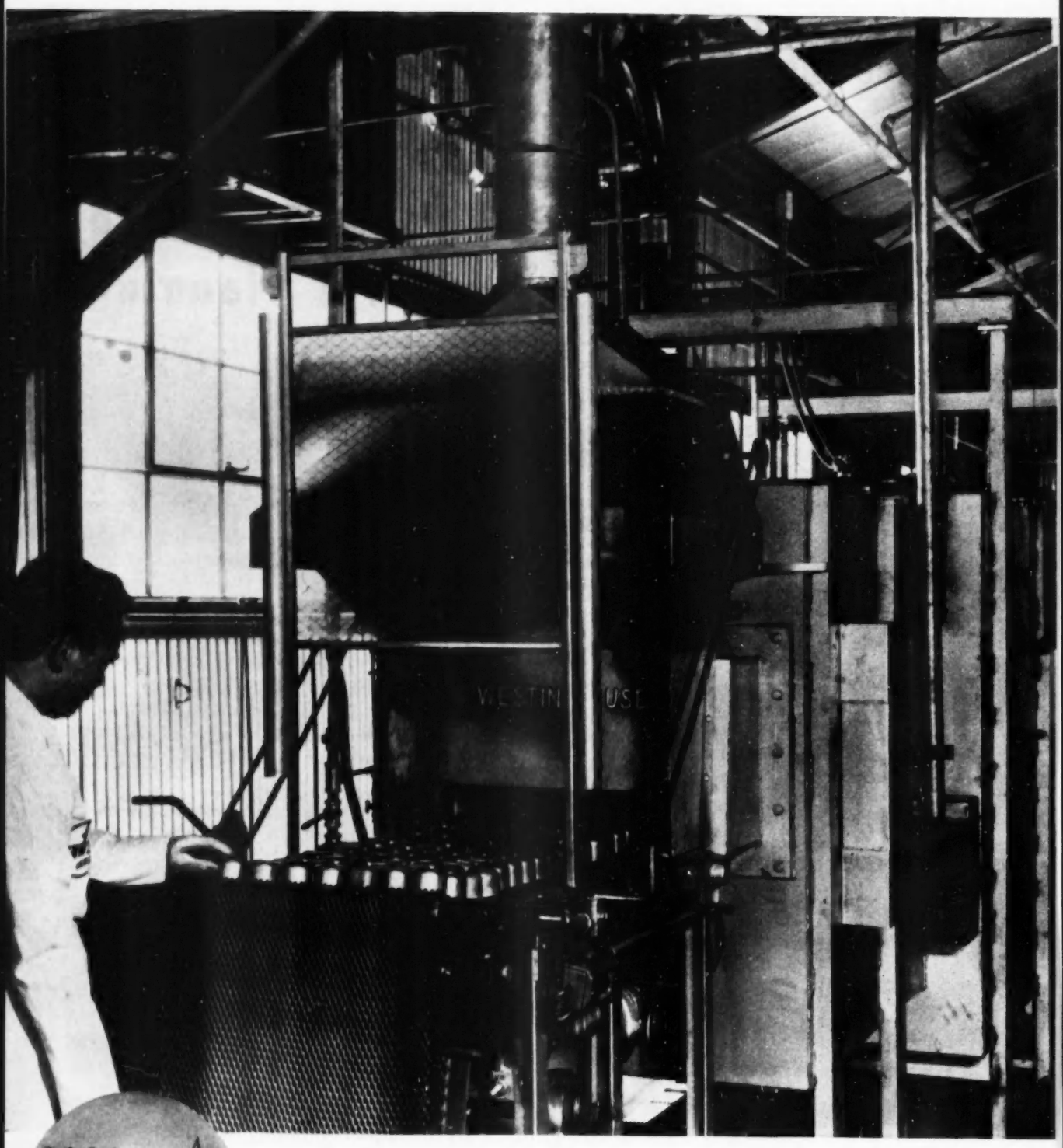
COMPANY .....

ADDRESS .....

CITY ..... **ZONE** .... **STATE** .....

DETREX CORPORATION

DEGREASERS • DEGREASING SOLVENTS • WASHERS
ALKALI & EMULSION CLEANERS • DRYCLEANING
EQUIPMENT • PHOSPHATE COATING PROCESSES



IF YOUR PRODUCT CALLS FOR HEAT-TREATING . . . IT CALLS FOR A WESTINGHOUSE FURNACE . . . *GAS OR ELECTRIC.*

"Production capacity increased 400% with Westinghouse Sintering Furnace"

. . . says Kwikset Locks, Inc.

As the largest producer of custom-molded powdered metal parts west of the Mississippi, Kwikset Locks, Inc., of Anaheim, California, has this to say about its Westinghouse Sintering Furnace:

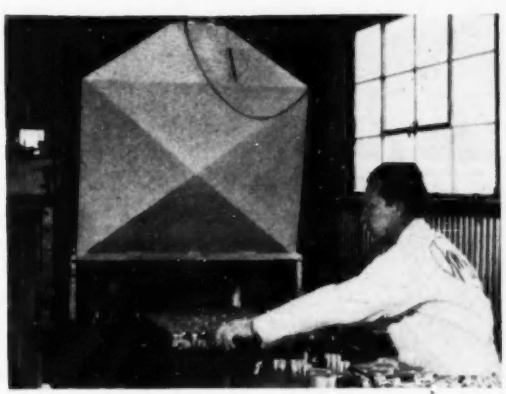
"We chose a Westinghouse Electric Belt Conveyor Furnace when desiring four times the production capacity formerly available. We now enjoy the desired protective atmosphere needed for top-quality control, gain excellent temperature control and response, and take advantage of fast Westinghouse engineering and repair service. We have found, through experience, that Westinghouse Furnaces are easy to operate.

"Our principal operation is sintering brass components for our residential and commercial lock sets. These parts were formerly machined from bar stock, precision cast or stamped. By converting to the sintering process with a Westinghouse Electric Belt Conveyor Furnace, we have eliminated scrap and machine finishing . . . thus increasing production and reducing costs."

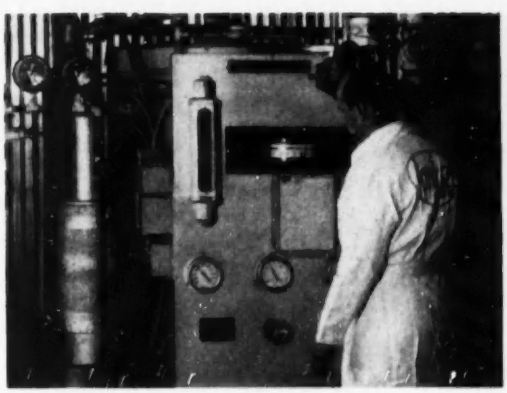
Why not investigate Westinghouse Heat-Treating Furnaces for your plant? A complete line covering every heat-treating job is available. Write for free book *Harnessing Heat* (B-5459). Westinghouse Electric Corporation, Industrial Heating Department, Meadville, Pa. J-10412

YOU CAN BE **SURE**... IF IT'S

Westinghouse



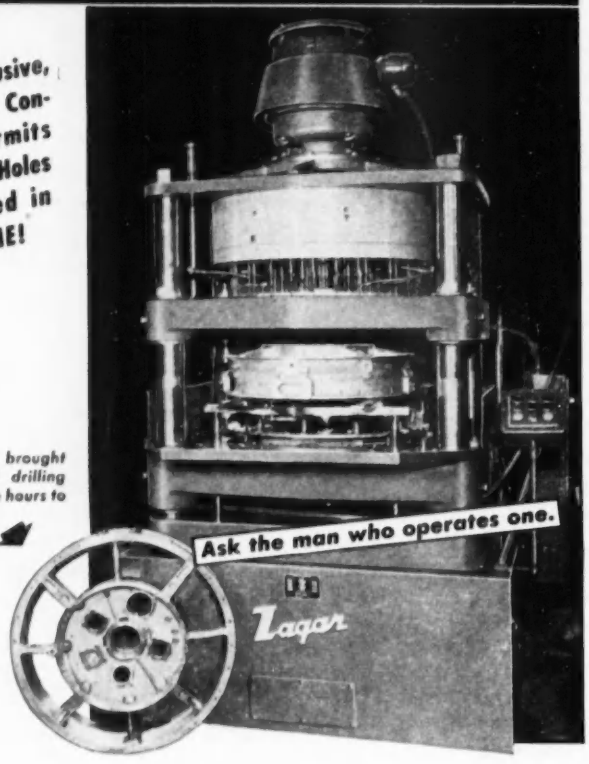
The above shows the "briquettes" after they have left the cooling chamber where they have been cooled below oxidizing temperature. If unusually close tolerances are not involved, the pieces are used as sintered.



Shown above is the Westinghouse Ammogas® Atmosphere Generator (1500 cfh, 1850° F. max.) that gives Kwikset Locks, Inc., the desired atmosphere for top-quality control.

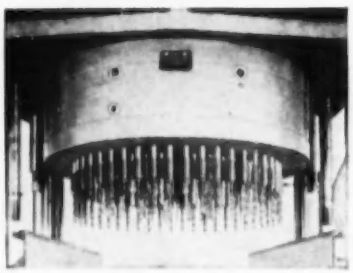
Packard, Too, Uses Zagar ENGINEERED DRILLING IN STANDARD ZAGAR DRILLING MACHINES

Zagar's Exclusive, Rigid 4-Post Construction Permits Hundreds of Holes to Be Drilled in RECORD TIME!



Zagar engineering brought down the time of drilling this part from three hours to seven minutes.

This jet engine part suggests the almost unlimited possibilities in drilling hundreds of holes at one pass. Zagar 4-post machines are built around interchangeable gearless drillheads. Any number of holes on all centers can be drilled as close as twice drill diameter in any material. Zagar's 4-post machines achieve heavy duty, multiple-spindle, close center drilling. . . with greater horsepower and thrust, with better alignment and accuracy, with less breakage of *small drills*. . . Let our engineers calculate your savings by demonstrating the Zagar method.



Zagar Interchangeable Drillhead.

★ ★ ★

Write for Catalog U-11

ZAGAR TOOL, INC. 24000 LAKELAND BLVD. CLEVELAND 23, OHIO

Zagar TOOLS FOR INDUSTRY and SPECIAL MACHINERY

New Production EQUIPMENT

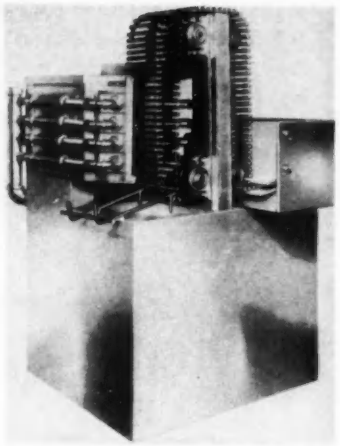
(*Continued from page* 194)

The bronze ram, the slide ways, and the gib are hand scraped for fit. *Versa-Mil Co.*

Circle 95 on page 73 for more data

End Heating Unit

Using production figures based on heating a four in. end-section of ½ in. rod—the "Hot Rod" end heating unit now available is said to bring the rod to 1900 F, in 50 sec, with an hourly production of 900 rods. Similarly, a ¾ in. rod reaches the same tempera-



ture in 75 sec with hourly production of 600 rods. Designed with conveyor and automatic hopper feed, it is said to handle stock sizes of rod from ¼ in. to 1½ in. diam, with varying number of burners to satisfy the particular stock and production to be handled.

Length of section heated may be up to four in., and over-all length of pieces six in. to 24 in.

The manufacturer states that the 'Hot Rod' unit is ideally suited for rod end heating—upsetting, bolt heading, swaging, localized hardening, etc., with a noteworthy saving in production time and cost. *Gas Appliance Service, Inc.*

Circle 96 on page 73 for more data

Dust Filter

Offered to the trade are three sizes of sandblast cabinets, a tilted blast

(*Turn to page* 200, *please*)



ONE OF A SERIES

On Our Golden Anniversary we salute the . . . . .

Truck and Bus Industry

Over rolling hills of the East, through the broad, flat Midwest plains, past the mountains and desert areas of the West rolls a constant caravan of trucks and buses, economically carrying travelers and commercial goods to every part of the nation. No longer is the small town isolated, dependent on "one stop a day" transportation or shipping schedules, for the trucks and busses have knit all America into a single unit.

The early days of the industry were beset with mechanical delays and disappointments, but finer engineering, better production methods and precision-made parts make it possible to meet dependable time schedules day and night, in even the most rugged terrain and under the toughest weather conditions.

Burgess-Norton, manufacturing piston pins and other precision parts, is proud to have served this important industry through these years.



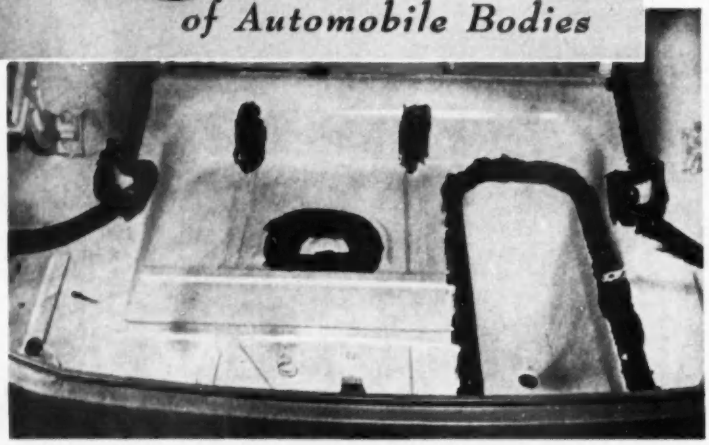
BURGESS-NORTON MFG. CO.

GENEVA, ILLINOIS

SERVING INDUSTRY FOR 50 YEARS



HOW PRESSTITE Body Sealers Seal in the Quality of Automobile Bodies



Rear deck area protected by body sealer on floor pan seams.

Modern high-speed automobiles create a vacuum which pulls in an unbelievable amount of dust, dirt and water from the road. To protect finely finished interiors, to prevent rust and corrosion, and to eliminate rattles, all body seams, joints and gaps must be tightly and permanently sealed.

A tough, flexible, completely tight seal is provided by Presstite body sealers, either rubber asphaltic base types or plastisols. Their excellent adhesion is unaffected by high or low temperatures, weathering, vibration or movement.

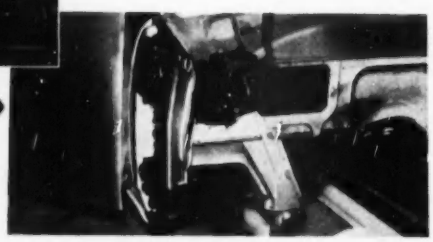
These body sealers are just a few of many types of Presstite sealers used extensively in sealing automobile, truck and bus bodies. Others include windshield and back light sealers, spot-weld sealers, plastic sealers, elastic compounds, sealer washers, expanding rubber sealers, Permagums and web coating.

Consult Presstite, specialists in sealing compounds since 1924, for the best answers to your sealing problems.



Floor pan seams at toe boards brushed with body sealer.

Air intake duct permanently sealed against dust and air leakage.



PRESSTITE Sealing Compounds

In Canada: Railway and Power Engineering Corp., Ltd.

PRESSTITE ENGINEERING COMPANY

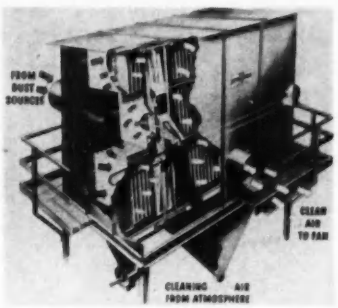
3760 Choteau Ave. • St. Louis 10, Mo.

New Production EQUIPMENT

(*Continued from page* 198)

mill, and a blast tank. The blast cabinets and tilted mill will be operating, and the dust created in the blast cleaning operations will be completely collected by the new No. 6-C Dynaclone dust filter.

The Dynaclone is an improved cloth bag type dust filter, which draws in dust-laden air from a dust source, such as grinders, and cleans the air by passing it through the fabric of the filter bags. The dust is collected on the outside of the filter bags.



To remove the dust so that it is deposited in the hopper below the casing, a traveler continuously moves back and forth across the open ends of the filter bags, introducing clean, atmospheric air in a reverse direction, which blasts off the accumulated dust so that it falls into the hopper below. *W. W. Sly Manufacturing Co.*

Circle 60 on page 73 for more data

Column Press

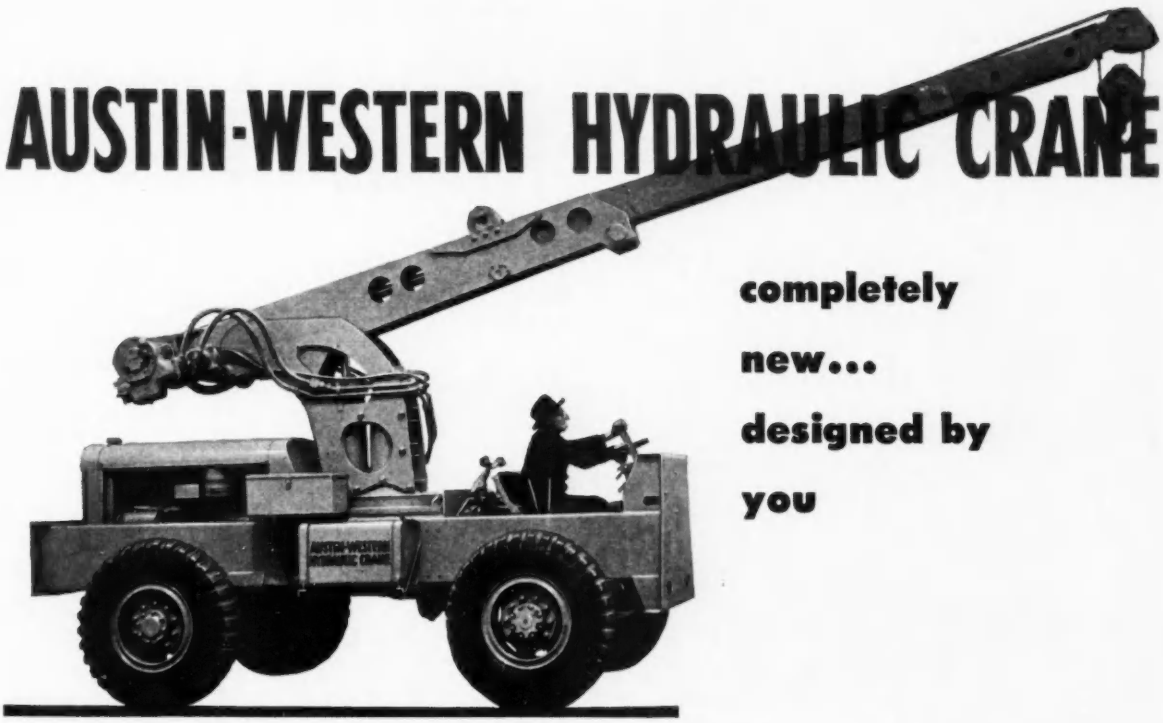
Four variations of a recently designed column press are now available.

One adjustable stand takes air cylinders with either three in. or four in. bore, either single-acting or double-acting. The double-acting cylinders can be furnished with any length of stroke from zero in. to 36 in. The presses illustrated have four in. stroke. The single-acting cylinders have maximum stroke of four in.; return stroke by internal spring.

Upper ram of the double-acting presses is provided with depth stop

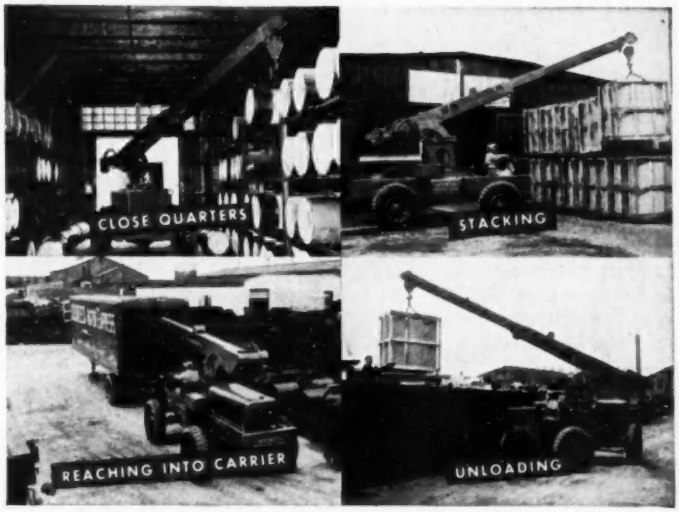
(*Turn to page* 202, *please*)

AUSTIN-WESTERN HYDRAULIC CRANE



completely new... designed by you

the crane of unlimited indoor-outdoor use



Designed only after making a complete analysis of your crane requirements—here is TOMORROW'S answer to TODAY'S materials handling problems.

Completely hydraulically operated including

- **Continuous 360° turntable rotations**
- **Extension and retraction of the boom**
- **Raising and lowering of the cable**
- **Boom elevation**

This amazing, new, self-propelled Hydraulic Crane, with its pickup, carrying and placement capabilities combines the best features of crawler, truck and erection cranes with those of industrial shop cranes . . . and, like all other Austin-Western products, it's "Built to Outperform".

Send for additional information NOW.

AUSTIN-WESTERN COMPANY
Construction Equipment Division • Baldwin-Lima-Hamilton Corporation
AURORA, ILLINOIS, U.S.A.

Power Graders • Motor Sweepers
Road Rollers • Hydraulic Cranes

AUSTIN-WESTERN COMPANY
624 Farnsworth Avenue, Aurora, Illinois

Please send complete information and literature on the Austin-Western Hydraulic Crane.

Name.....

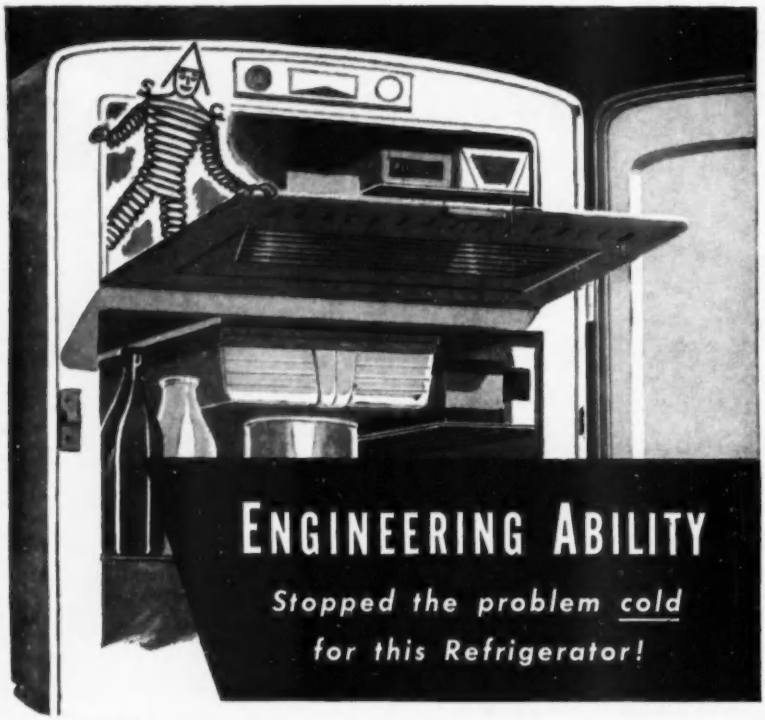
Title.....

Company.....

Street.....

City..... Zone..... State.....

Other products: Power Graders, Motor Sweepers, Road Rollers



. . . with Springs by Automatic Spring Coiling Co.

The need was very specific—

"Give us a spring," this refrigerator manufacturer requested, "that can THINK . . . so to speak. We have an evaporator door to the cold chest compartment that must respond to the touch of a finger, swing open to a certain angle, and stop there. It should also be possible to close the door with a nudge of a food-burdened housewife's elbow."

So . . . Automatic Spring Coiling Co. was called in and *Engineering Ability* came through!

The answer . . . calculated by our engineers . . was to design a spring with precisely the right *build-up*, with just the right combination of spring and wire diameter. In this way, not only would the spring do the required job—metering out its energy at the right rate—but also tolerances would be such that production could be handled with facility on our high speed equipment.

Put Automatic Spring Coiling Co. to work on *your* spring problem. See how members of our entire organization—consultants, designers, sample-makers, inspectors—swing into operation and *click*. Working as a well-integrated team with strict adherence to Quality Control we pledge ourselves to bring you the finest, most dependable springs to insure the successful and efficient performance of your product.

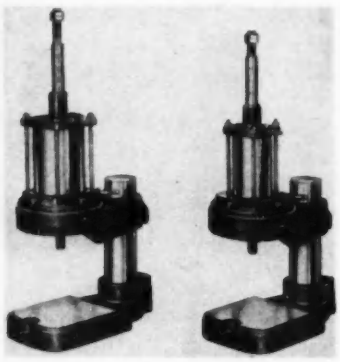
Our veteran consulting engineers are ready to survey your requirements without obligation. Please write.

AUTOMATIC SPRING COILING CO.
4048 West Thorndale Avenue
CHICAGO 30, ILLINOIS

New Production EQUIPMENT

(*Continued from page* 200)

nuts and collars to regulate the stroke exactly within the limits of the cylinder ordered. The single-acting press has no upper ram nor depth stop adjustment. Mounting bracket permits



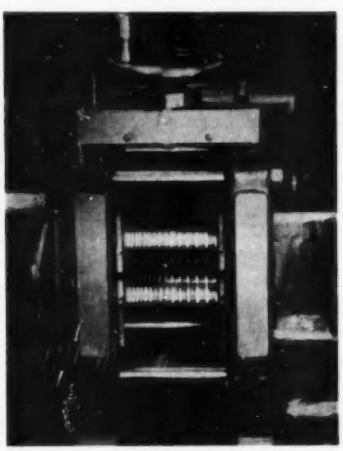
both vertical and radial adjustment. Column is solid steel, table is machine surfaced but not hardened, to allow mounting of special tooling.

All rams can be made non-rotating with the addition of a bracket, at slight extra cost. *Mead Specialties Co.*

Circle 61 on page 73 for more data

Rolling Mill

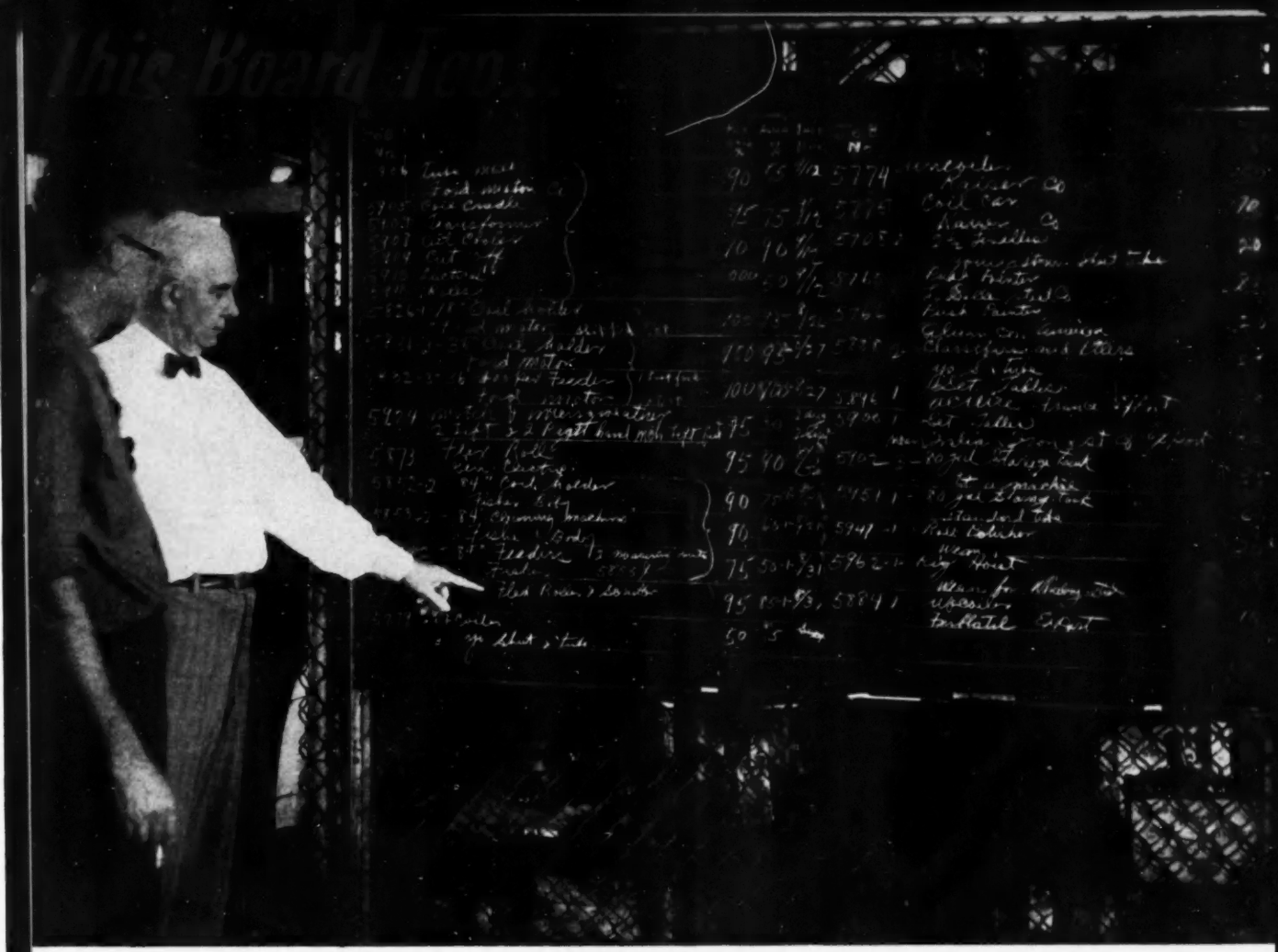
Four in. flat and wire rolling mills, type C-200, have been displayed re-



cently. All of the machines are said to occupy a minimum of floor space.

It is claimed that great versatility is achieved by mounting standard

(*Turn to page* 206, *please*)



LISTS AMERICA'S FOREMOST MANUFACTURERS

Through the years this board has carried the names of America's best known manufacturers. They build their names on quality products at fair price and they must have sturdy, long-lasting, maintenance-free, high-production, precision equipment to achieve this end consistently.

Getting just such quality equipment is the reason why their names appear on this board. For this is the Production Board at Plant 2 of the McKay Machine Company, one of the world's best known builders of standard and special metal working machinery.

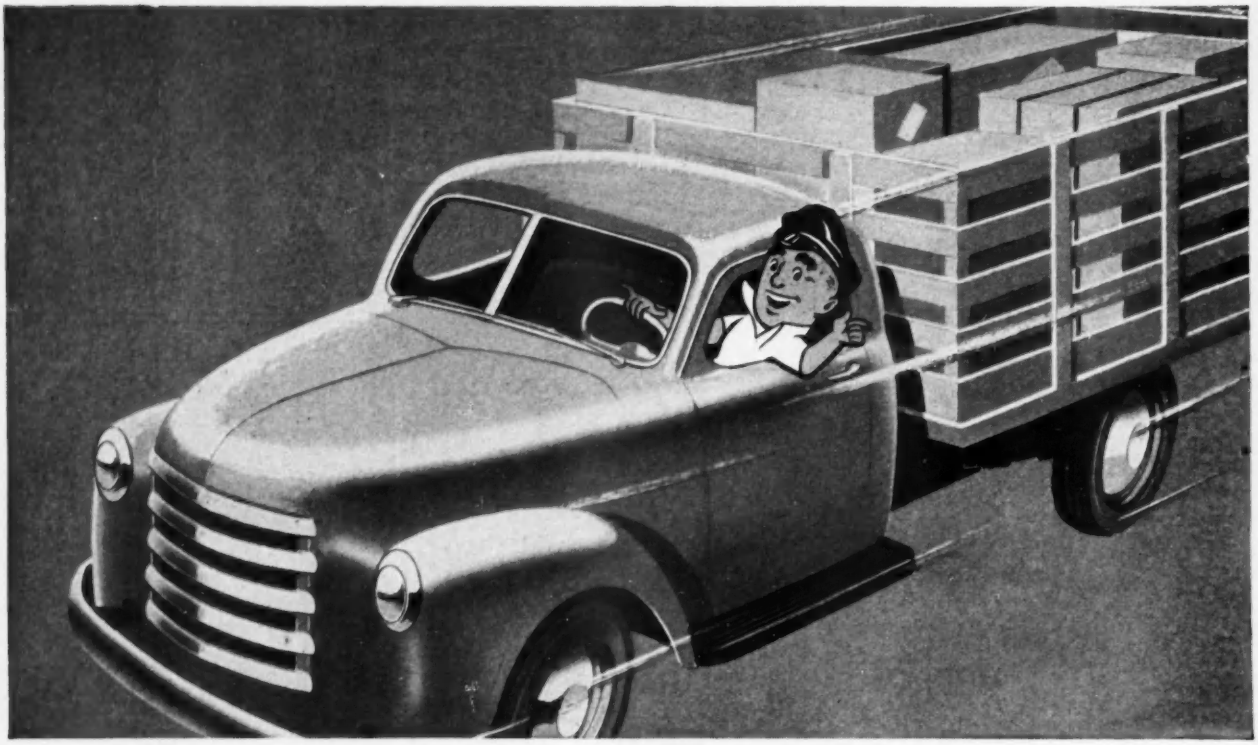
For example, if you were to read the board the day the photographer took this picture you would find such familiar names as Ford Motors, Motch and Merryweather, Fisher Body, General Electric, Kaiser, Youngstown Sheet and Tube, Aluminum Company of America, Wean Engineering, Wheeling Steel, Standard Tube, and LaSalle Steel. At any other time, just as impressive a list of leading manufacturers could be found on this board.

So, if you use special or standard metal working equipment such as forming machines, draw benches, tube mills, levelers, upcoilers, strip processors, press feed lines, shear lines, coil handling equipment, join America's best known manufacturers on this McKay Production Board.

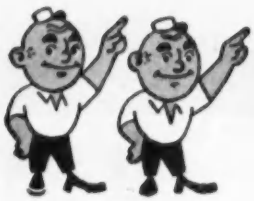
The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES



1 **In billions** of miles traveled by millions of trucks, automobiles, buses, and tractors, Bundyweld has established a solid reputation for complete reliability.



You gain even more than safety when you choose Bundyweld Tubing

WHY BUNDYWELD IS BETTER TUBING



Bundyweld starts as a single strip of copper-coated steel. Then it's . . .



continuously rolled twice around laterally into a tube of uniform thickness, and



passed through a furnace. Copper coating fuses with steel. Result . . .



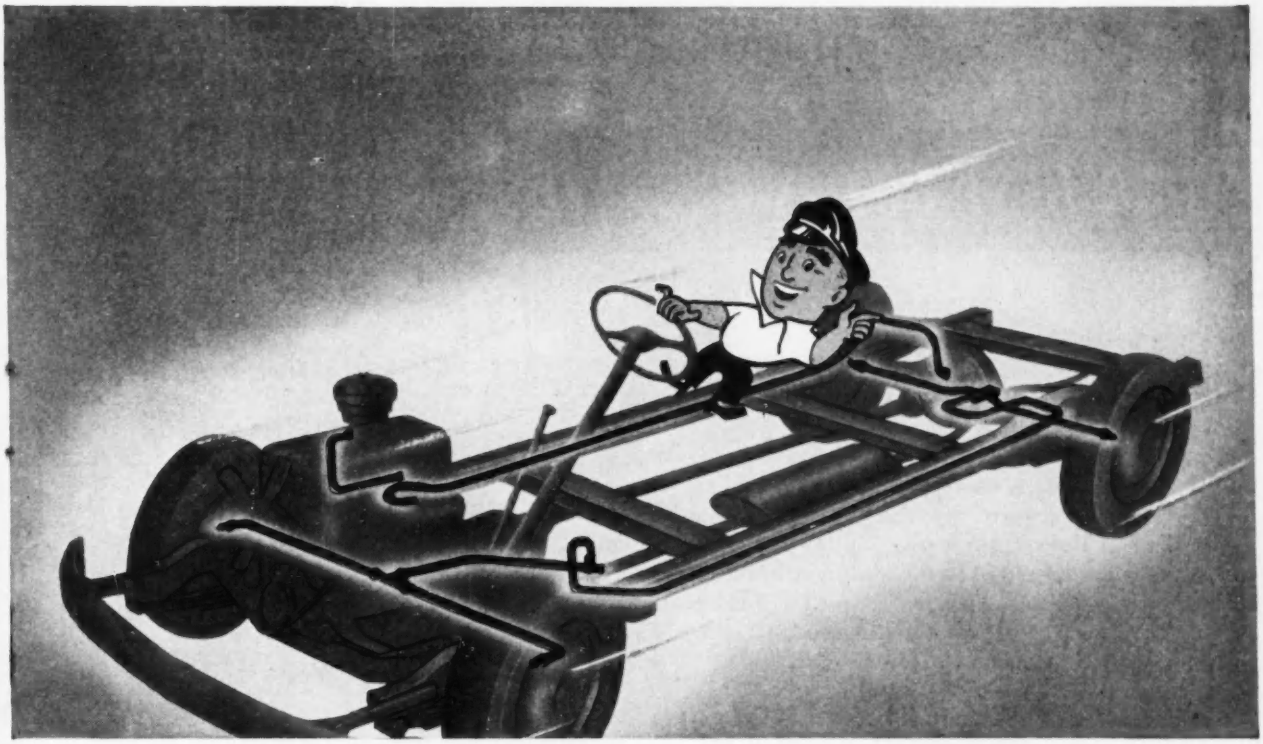
Bundyweld, double-walled and brazed through 360° of wall contact.



← **NOTE** the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: Cambridge 42, Mass.: Austin-Hastings Co., Inc., 226 Binney St. • **Chattanooga 2, Tenn.:** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • **Chicago 32, Ill.:** Lapham-Hickey Co., 3333 W. 47th Place • **Elizabeth, New Jersey:** A. B. Murray Co., Inc., Post Office Box 476 • **Philadelphia 3, Penn.:** Rutan & Co., 1717 Sansom St. • **San Francisco 10, Calif.:** Pacific Metals Co., Ltd., 3100 19th St. • **Seattle 4, Wash.:** Eagle Metals Co., 4755 First Ave., South • **Toronto 5, Ontario, Canada:** Alloy Metal Sales, Ltd., 181 Fleet St., East. • **Bridgeport, Conn.:** Kothumel Steel & Aluminum Co., 117 E. Washington St. • **Los Angeles 58, Calif.,** Tubesales, 5400 Alcoa Ave.

Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.



2 **Regardless** of the kind of vehicle you're concerned with, you'll gain new peace of mind —and much more—with Bundyweld in your gasoline, oil and hydraulic brake lines.

Safety and Bundyweld Tubing go hand in hand in the automotive industry.

That's been proved by the trouble-free performance of almost 500,000 miles of Bundyweld used in automotive tubing parts in the last twenty years. But you gain even more than safety when you use Bundyweld.

For instance, you get help from skilled tubing engineers who'll work with you to crack tough problems in design, fabrication, or function. As you work with our men, you'll see why we can recommend them as people who know their Bundyweld inside out and understand your problems, too.

You get the automotive industry's most up-to-date and versatile fabrication facilities working for you. This pays off in parts accurately produced at lowest possible cost, carefully inspected, properly packed for safe transport and economical handling, shipped to arrive exactly when you want them. If your plant's equipped for fabrication you can order Bundyweld in easily handled straight lengths, too.

You get tubing properties no one's ever equaled. Bundyweld is the only tubing double-walled from a single strip, copper-brazed through 360° of wall contact. It's leakproof. It's lighter, yet stronger —withstands severe shocks and has high fatigue limit.

For tubing that's the standard of dependability in the automotive industry, for engineering help and fabrication facilities you can't beat, come to Bundy, world's largest producer of small-diameter tubing.

BUNDY TUBING COMPANY • DETROIT 14, MICHIGAN

Bundyweld® Tubing



DOUBLE-WALLED FROM A SINGLE STRIP

in portable grinders

YOUR BEST BUY IS BUCKEYE

When Southern Sanitary Enameling Co., Nashville, needed an additional portable grinder, naturally they specified Buckeye. Why?

Because their first Buckeye grinder, purchased in 1927, is still in use after 25 years grinding gray iron castings without any down-time for major repairs.

In fact, when this "veteran" finally came back for reconditioning, the original cylinder showed no measurable signs of wear. The only parts replaced were three inexpensive rotor blades.

Unusual? Perhaps, but it does indicate that a Buckeye grinder will provide exceptional service, even on the toughest grinding applications. There are 55 grinders listed in our Air Tools Catalog, one of them designed just for your kind of grinding work. Write today for your copy.



Buckeye Tools CORPORATION
DIVISION 21 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

New Production EQUIPMENT

(*Continued from page* 202)

heads in various combinations on a single base. The C-200 machine offers a choice of either roller or bronze bearings, plus the addition of bored rolls with leakproof rotary joints for heating or cooling. Total weight of the machine is 2350 lb. *Stanat Mfg. Co.*

Circle 62 on page 73 for more data

Centrifugal Fan



The airfoil Type A centrifugal Fan for heating, ventilating, and air conditioning applications is now available. Wheel is of the backward curve type with airfoil hollow-sectioned blades. Both wheel and housing are of all-welded heavy-gage steel plate construction.

Air deliveries of 600 to 750,000 cfm with ⅛ in. to 32 in. static pressures are provided. Wheels range from 12 in. to 123 in. in diameter. *Chicago Blower Corp.*

Circle 63 on page 73 for more data

Vertical Retort Furnace

A vertical retort furnace for carburizing, nitriding, dry cyaniding, clean hardening, bright annealing, and for other operations requiring temperatures to 1850 F is equipped for pressure carburizing.

The furnace is operated by automatic controls, and it has a cover in which is mounted a motor driven fan for circulating the carburizing gas throughout the charge in baskets within a sealed retort. The retort is

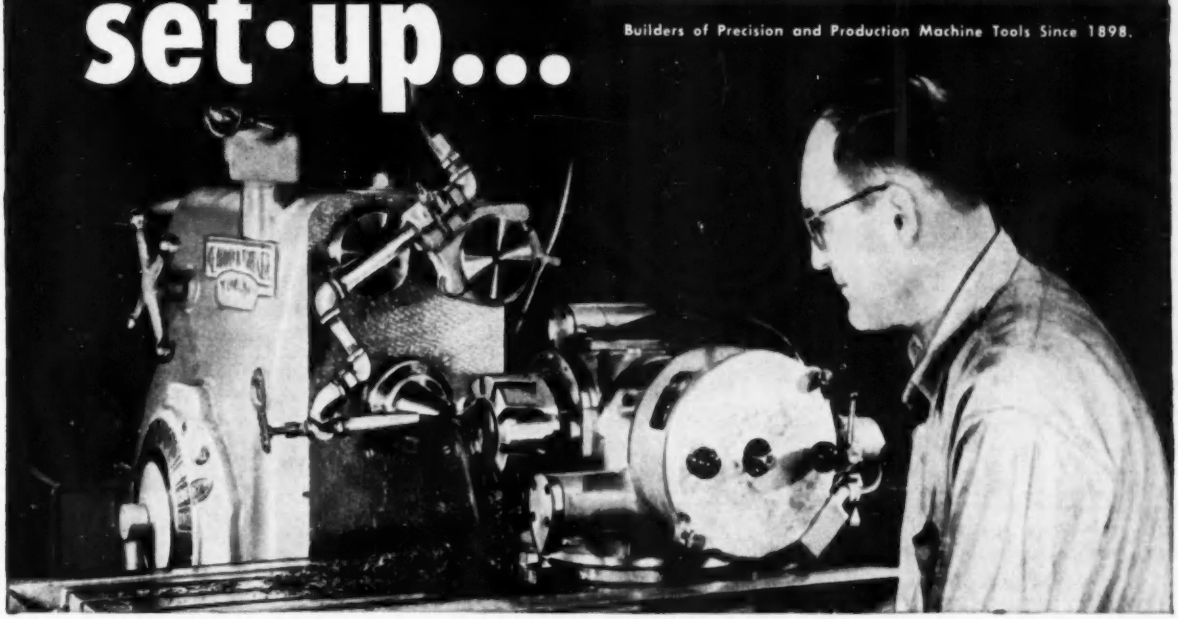
(*Turn to page* 208, *please*)

What a set-up...

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Special Machinery Division

Builders of Precision and Production Machine Tools Since 1898.



for the customer . . it put a one-at-a-time indexing job on a production basis!

for the operator . . only one motion controls entire indexing and milling operation!

THIS Universal Automatic Indexing Attachment, used in conjunction with the automatic cycle table movement on a Kearney & Trecker milling machine, eliminated a tedious dividing head job. A large midwest machine tool builder found this setup ideal for milling slots in face-milling cutter bodies.

CYCLE TIME CONSIDERABLY REDUCED . . . after each cut the table automatically retracts just enough to clear the cutter . . . attachment indexes automatically and next cut begins.

NOTCH PLATES CONTROL ACTUAL INDEXING . . . up to 24 divisions possible . . . plates changed in a matter of seconds . . . can be indexed two ways, automatically and manually.

ANY PRACTICAL ANGLE OBTAINABLE . . . workholding spindle housing can be swung 15° below horizontal and 15° beyond vertical (total 120° tilt). It swivels 140° about its vertical axis.

Request additional information on this versatile attachment.



Capacity . . . Experience . . . Performance

Upon completion of this $5,200,000 expansion of our Special Machinery Division, we offer you (1) unmatched facilities, (2) experience based upon more than 50 years in the design and production of special machinery, and (3) performance, best recommended by our outstanding record of successfully solving many hundreds of unusual machining problems.



For complete details on this attachment . . . ask for *Data Sheet No. 1008*. Free booklet describing the facilities of the Special Machinery Division is also yours for the asking. WRITE TODAY TO SPECIAL MACHINERY DIVISION, KEARNEY & TRECKER CORP., 6784 W. NATIONAL AVE., MILWAUKEE 14, WISCONSIN.

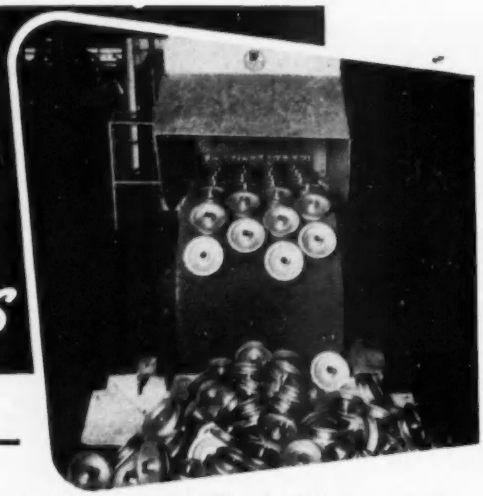
KEARNEY & TRECKER CORP. · *Special Machinery Division*

MILWAUKEE 14, WIS., U. S. A.

EF

BRAZING FURNACES

—Gas Fired or Electric—



cut material, tooling and finishing costs

● For instance, brazing a disc on the end of a tube may use 75 to 80% LESS material than if the hollow flanged part is cut from the solid. Finishing costs are low too, because the assemblies are discharged smooth and scale-free.

Brazing also avoids localized overheating, distortion and the cost of straightening. It's ideal for most any size, shape or quantity requirement.

A fully descriptive brazing folder, including many suggested "do's" and "don'ts", sent on request. Write today!

EF

THE ELECTRIC FURNACE CO.

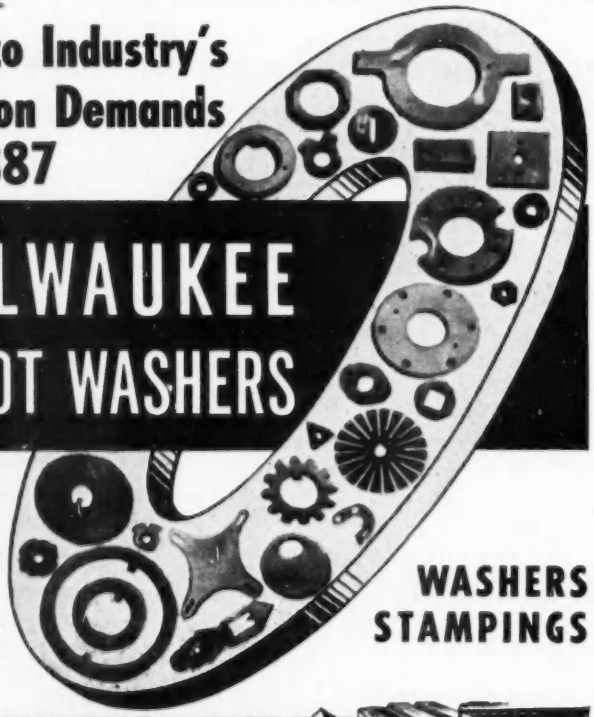
GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada

Geared to Industry's Production Demands Since 1887

MILWAUKEE WROT WASHERS



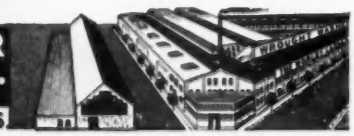
Offering the most complete line of washers available today . . . all types and sizes, all materials, all finishes. More than 25,000 sets of dies. Let us quote on your requirements.

WASHERS STAMPINGS

WROUGHT WASHER MANUFACTURING CO.

The World's Largest Producer of Washers

2212 S. BAY ST., MILWAUKEE 7, WIS

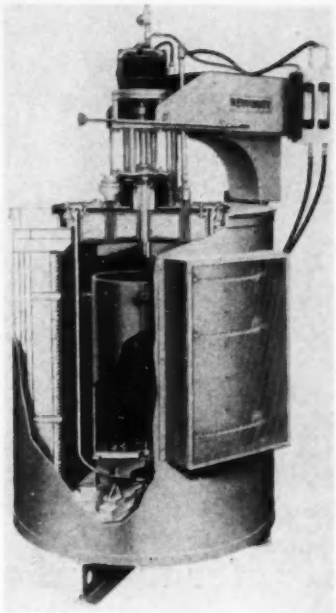


New Production EQUIPMENT

(*Continued from page* 206)

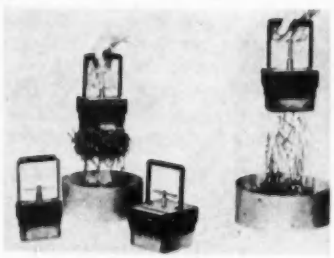
sealed with a gasket to maintain positive pressure.

Heating elements are of the return bend type with radiant plate mount-



ings. They are connected in separate circuits to give two or more independently controlled zones assuring temperature uniformity. *Hevi Duty Electric Co.*

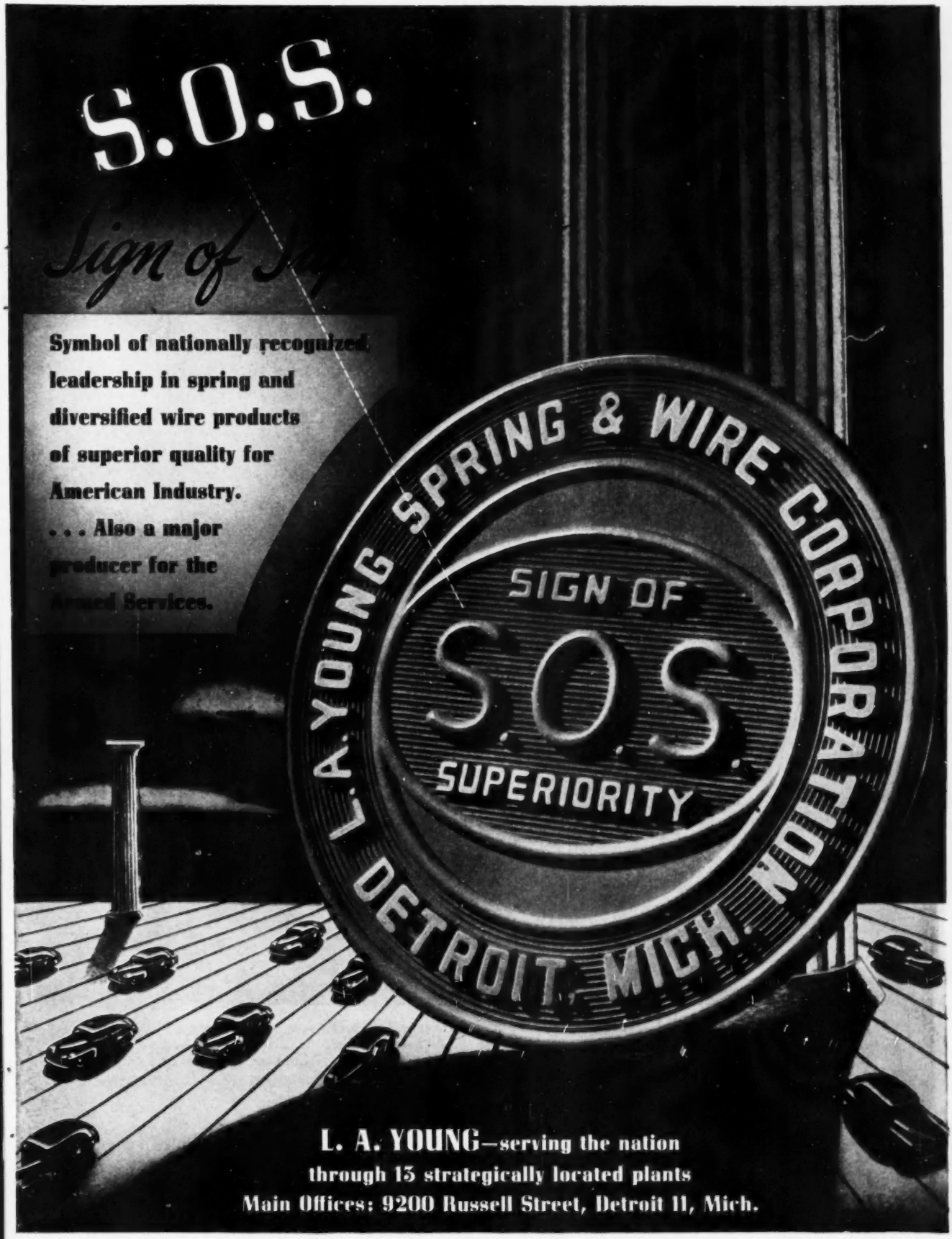
Circle 64 on page 73 for more data



Improved Magnet

A 70-Series permanent-magnetic Multilift hand Magnetool, replacing the old Model S, has been announced for rapid pick-up of small parts. Improvements include elimination of the projecting shelf which impeded pick-up in certain applications, greater capacity, easier burrowing into leads, and increased durability. In addition, the new series has been made more dust and water proof. (Magnetool Div., Multifinish Mfg. Co.)

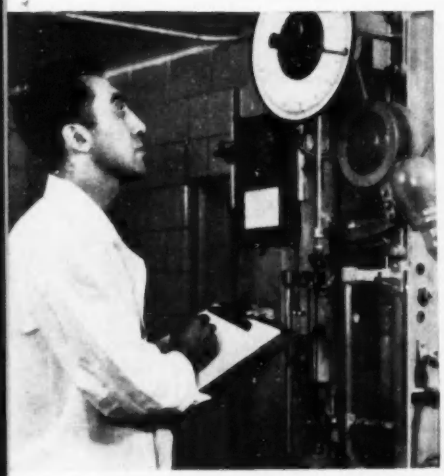
Circle 65 on page 73 for more data


S.O.S.
Sign of
Symbol of nationally recognized leadership in spring and diversified wire products of superior quality for American Industry. . . . Also a major producer for the Armed Services.
L. A. YOUNG SPRING & WIRE CORPORATION
SIGN OF
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SUPERIORITY
DETROIT, MICH.
L. A. YOUNG—serving the nation
through 13 strategically located plants
Main Offices: 9200 Russell Street, Detroit 11, Mich.

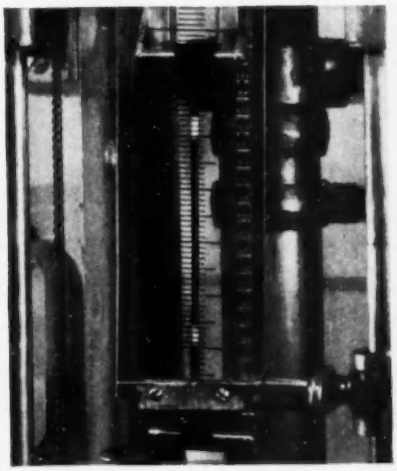


1. Over 800 Parker compounds have been developed to meet your individual O-ring and custom-molded rubber requirements. Just *any* compound won't do the job. Parker checks your specifications to see which compound is best. If none do the job, we'll formulate and mix (shown above) a special compound to solve your individual problem.

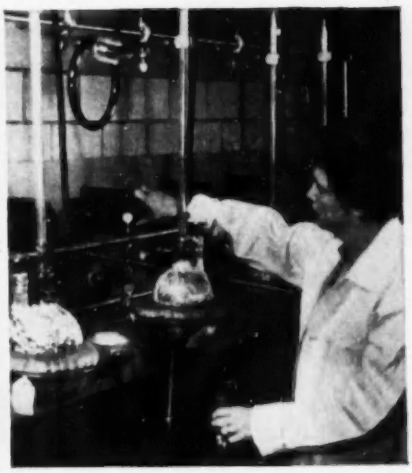
Look how Parker makes sure you get the right O-ring for each specific application



2. Tensile strength is one of the many specifications that each Parker O-ring compound must pass. Other tests prove resistance to both tear and abrasion.



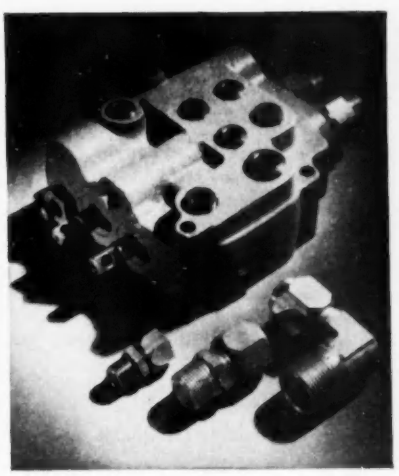
3. Elongation, being tested here, and maximum compression set are other vital factors that determine which compound will assure leakproof O-rings for your application.



4. Fluid and temperature tests help assure long life of Parker O-rings. Compounds are checked for resistance to oil, fuel, or chemicals at high or low temperatures.



5. Prove for yourself that Parker O-rings are right for your specific application. They're economical to use. And they help designers save weight and space!



6. What other Parker products for hydraulic and fluid systems interest you? Triple-lok flare tube fittings? Ferulok flareless fittings? New hydraulic directional control valves?

THE PARKER APPLIANCE COMPANY
Section 501-G
17325 Euclid Avenue
Cleveland 12, Ohio



Please send me the following information:

- ☐ O-ring catalog No. 5100
- ☐ Custom-molded rubber catalog No. 5201A1
- ☐ Information about these other Parker products _____

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

RUBBER PRODUCTS DIVISION
The Parker Appliance Company
17325 Euclid Ave., Cleveland 12, Ohio
1538 South Eastern Ave., Los Angeles, Cal.

Parker
Hydraulic and fluid system components

Here's expert Engineering Assistance...



Do you have peak engineering loads you're having trouble surmounting?

Do you have long range engineering projects you can't get time to develop?

Do you need specialized engineering talent for which your staff isn't geared?

Perhaps we have the answer.

We can give you qualified help *now*, or any other time, in your office or ours. We have a record of accomplishment which takes the risk out of calling on us for engineering aid of any kind.

We are especially staffed and experienced in engines . . . compressors . . . chassis . . . trucks . . . tractors . . . mobile and portable equipment . . . gearing . . . transmissions . . . machines . . . mechanical products and devices. A call will not obligate you and may provide just the help you need. Why not try it?

Barnes & Reinecke, Inc.

236 EAST OHIO STREET, CHICAGO 11, ILLINOIS

AUTOMOTIVE ENGINEERING • MECHANICAL ENGINEERING • Research • Development Testing • Prototypes

New Defense Facilities

SUPPLEMENTING the list of Certificates of Necessity issued up to September 21, 1953, authorizing new or expanded defense plant facilities for the manufacture of automotive and aviation war goods which were published in the October 15 issue, page 126, of AUTOMOTIVE INDUSTRIES, the following additional certificates were announced by the Defense Production Administration, September 21, 1953, to October 19, 1953.

Included in this latest tabulation, 18,160 new or expanded defense facilities of all types have been authorized for rapid tax write-offs, the total amount eligible for amortization, being $28,187,492,000. These figures are exclusive of cases that are up for later review but included in this list —in these cases, no dollar amount is listed. The figure appearing in parentheses is the percentage authorized for actual fast tax write-offs.

— B —

Barnes Drill Company, Rockford, Illinois
Machine tools—$286,477 (65)

Boeing Airplane Co., Wichita Div., Wichita, Kansas
Aircraft & aircraft parts—$25,557 (65)

Boeing Airplane Company, Seattle, Washington
Aircraft & aircraft parts—$203,990 (65)

— C —

The Cessna Aircraft Company, Wichita, Kansas
Aircraft assemblies—$400,000 (60)

— D —

Douglas Aircraft Company, Inc., Long Beach, Calif.
Aircraft & parts—$109,149 (60)

— E —

Ex-Cell-O Corporation, Highland Park, Michigan
Aircraft parts—$563,710 (65)

— H —

Hughes Tool Co., Hughes Aircraft Div., Culver City, Calif.
Research, development and production of military items—$87,024 (40)
Electronic equipment — $417,046 (65)

Hyster Company, Portland, Oregon
National handling equipment for defense industries—$431,233 (50)

— M —

The Glenn L. Martin Company, Baltimore, Maryland
Aircraft—$140,000 (60)

Minneapolis-Honeywell Regulator Co., Hopkins, Minnesota
Research and development for the Armed Services—$439,750 (40)

— P —

The Palmer Mfg. Co., Cleveland, Ohio
Ordnance and aircraft parts—$22,407 (70)

— W —

Western Electric Co., Inc., Winston-Salem, N. C.
Electronic equipment — $100,919 (65)

Westinghouse Electric Corporation, Lester, Pa.
Aircraft components—$209,200 (65)

BOOKS...

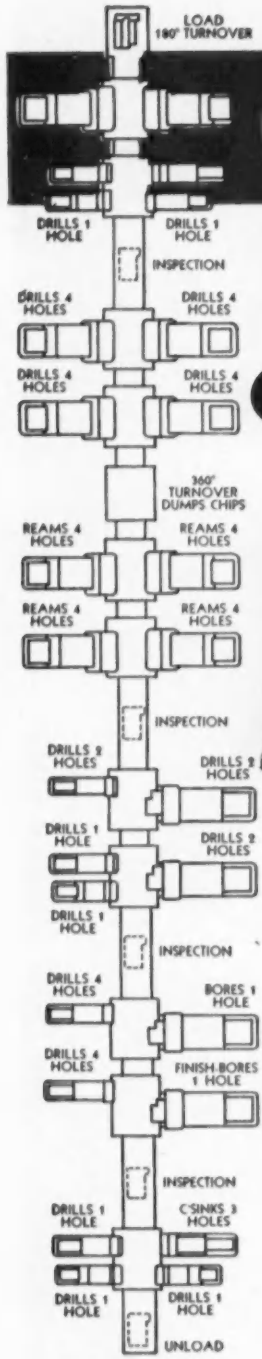
SIMPLE BLUEPRINT READING WITH SPECIAL REFERENCE TO WELDING AND WELDING SYMBOLS, *published by The Lincoln Electric Co., Cleveland 17, O. Price, $1.00.* This new and enlarged 207-page edition of a book for welders and others engaged in the fabrication of machinery is intended as a guide to a clear understanding of blueprints and how to use them in mechanical fabrication and construction. Special attention is given to the use of welding symbols. The book makes a simplified approach to mastering the reading of blueprints. Using a simple welded base as a study object, an explanation is made in step-by-step fashion of how the "sign language" of blueprints is used to transmit information. Large clear drawings are used to illustrate the explanation. After basic principles are explained, welding symbols and their use are fully described. Examples of where and how they are used are given in each case. To practice visualizing drawings, numerous blue prints taken from actual shops are reproduced, followed by photographs of the objects as they are made. The book explains subjects such as perspective drawing, isometric drawing, sight projection, center plane lines, dimensions, scales, sections, explanatory views, development of weld symbols, types of welds and gives questions and answers on subjects.

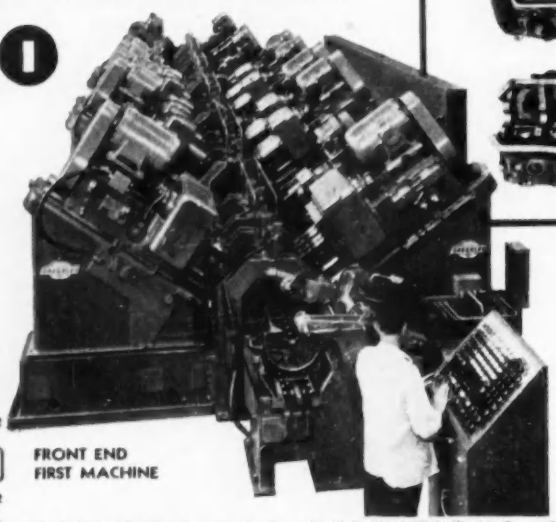
PILOT & AIR-CREW HANDBOOK, *published by Pilot's Handbook Co., Dept. 55, 5864 Hollywood Blvd., Hollywood 28, Calif. Price, $2.50.* This 72-page pocket-size handbook contains a wealth of valuable information for all pilots, air-crew, and ground crew, compiled in easy-to-find form. Just a few of the many sections include: air traffic rules, Standard Time Zone map, airway beacons and airway flying, flight planning, explanation of weather sequences, and navigation aids.


This die is different
because it is made of aluminum (Alcoa Aluminum Tool & Jig Plate). It is easier to handle, faster to machine and costs less to make than a steel one.
Alcoa Tool & Jig Plate is also used to make fixtures, low-pressure rubber and plastic molding dies and dies for forming aluminum sheet.
Alcoa casts Tool & Jig Plate in thicknesses from ¼" to 4". It is normalized and available from stock in widths up to 48" x 96", machined both sides.
Aluminum Company of America, 1951-L
Alcoa Building, Pittsburgh 19, Pa.
ALCOA ALUMINUM TOOL & JIG PLATE
Alcoa Aluminum
ALUMINUM COMPANY OF AMERICA

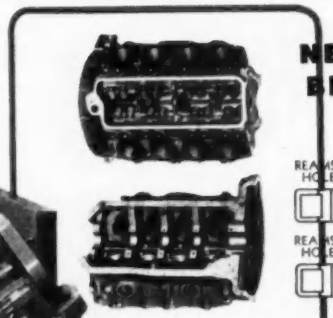
GREENLEE

TRANSFER MACHINES

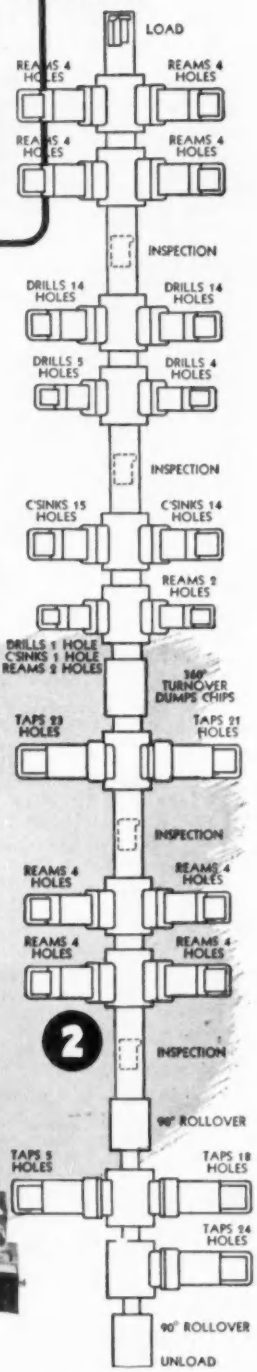




FRONT END
FIRST MACHINE



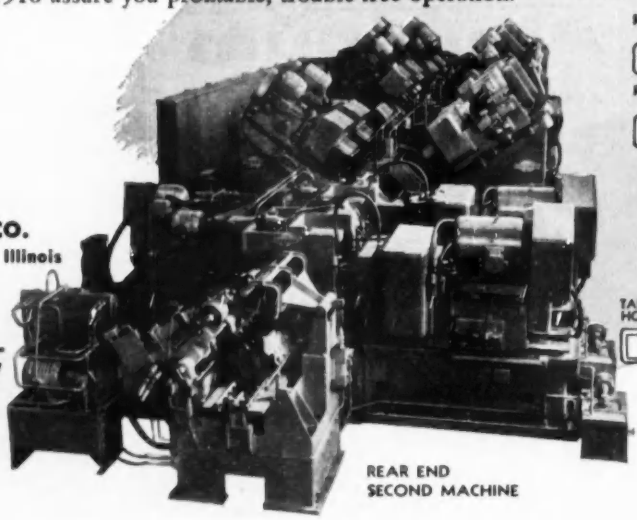
NEW V-8 BLOCKS



PERFORM 289 OPERATIONS ON V-8 CYLINDER BLOCKS AT 75 BLOCKS PER HOUR

New tooling for a brand new V-8 motor includes three lines of Greenlee Automatic Transfer Machines similar to the units illustrated. Each 2-machine line performs 289 operations on cylinder blocks during a 45-second cycle.

Sound construction, proved engineering, and a background of experience in building special machinery that dates back to 1918 assure you profitable, trouble-free operation.



REAR END
SECOND MACHINE

GREENLEE BROS. & CO.
1761 Mason Ave., Rockford, Illinois

PRODUCTION MACHINERY
GREENLEE

DOWEL PINS



HOW TO USE THEM

1. Precision Dowel Pins are principally used where parts must be accurately positioned and held in absolute relation to one another whether stationary or in motion. They facilitate quick disassembly and completely accurate re-assembly.

2. Allen Dowel Pins are also used as plug gauges.

3. As plugs for determining angular dimensions of dovetail slides.

4. As hinge and wrist pins in applications requiring initial and permanent accuracy.

5. As accurate, economical roller bearings and axles.

6. As guide pins, stops and position locators.

HOW TO JUDGE THEM

1. *On precision, for low tolerance applications.* (Allen Dowel Pins are ground to a maximum microinch finish of 6 RMS protected by a rust preventive.)

2. *On strength, for shear resistance.* (Allen Dowel Pins are made from special Allenoy Steel, heat treated. Single shear strength measures from 160,000 to 180,000 psi.)

3. *On hardness of surface and a core hard enough to prevent "mushrooming" when driven into a tight hole.* (Allen Dowel Pins have a surface hardness of 62-64 Rockwell C Scale and core hardness of 52-54. Average case depth .010 to .020 depending on size.)

The simple sure way to be sure of uniformly superior dowel pin quality is the same as in buying precision socket screws — *get genuine Allens from your Industrial Distributor.* Only he sells them but *we will welcome your direct request for literature or application engineering assistance.*

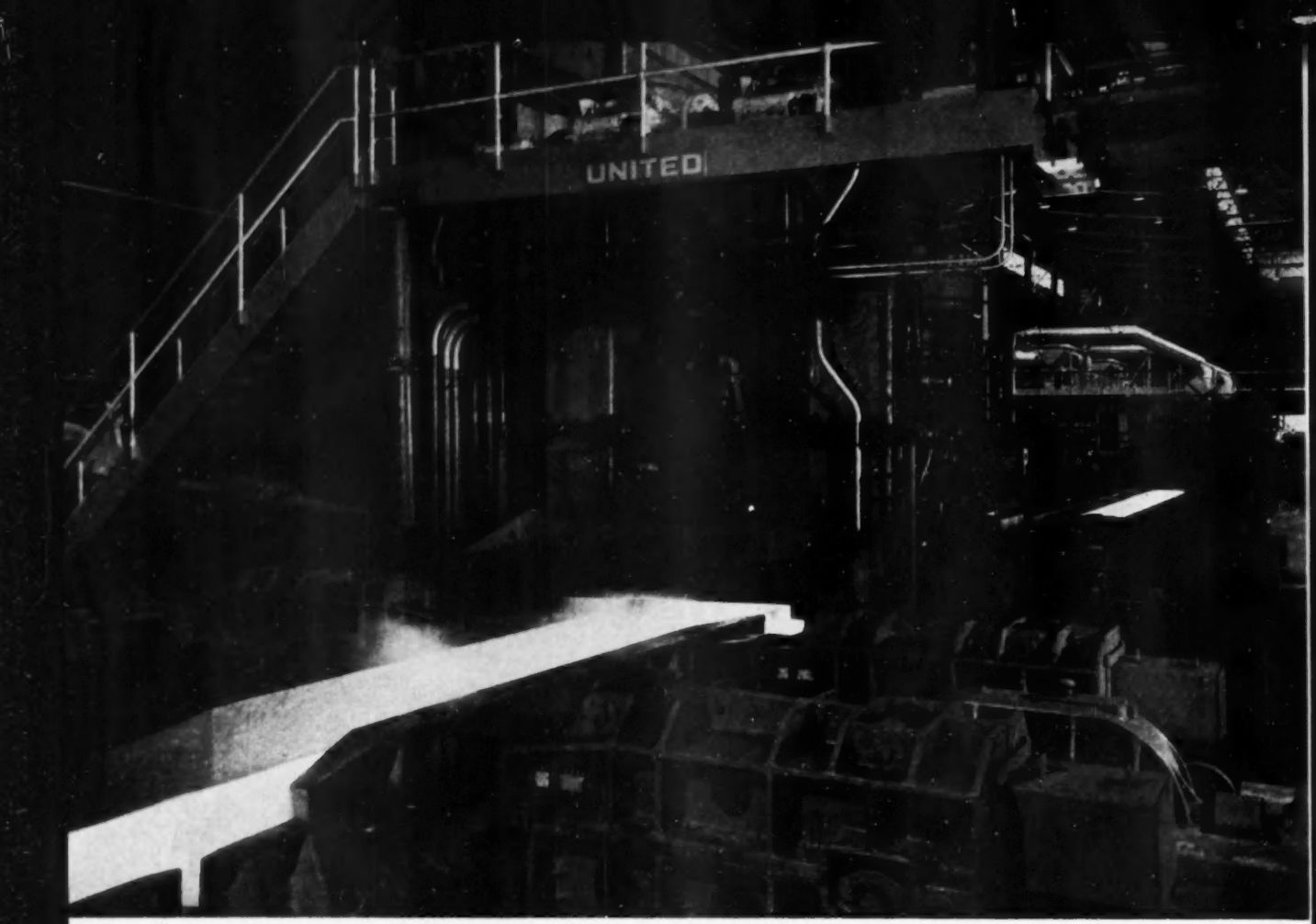
ALLEN HEAD

ALLEN

MANUFACTURING COMPANY

Hartford 2, Connecticut U.S.A.

Available in 108 Standard Sizes from ⅛" x ⅜" to 1" x 6". Standard tolerance .0002 oversize. Most sizes also standard in .001 oversize for repair work.



From this modern mill, one of the most versatile in the industry, comes . . .

Hot Rolled Sheet Steel—As You Like It

Pittsburgh Steel Company's sheet sales department, working in close cooperation with production men and metallurgists, can give you the kind of hot-rolled sheet steel you want—when you want it.



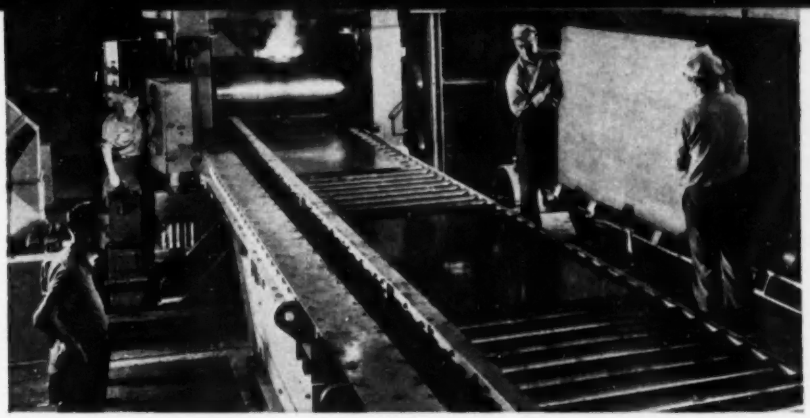
At the helm of sheet sales department at Pittsburgh Steel is John Cercone, Assistant General Manager of Sales. A veteran in the flat-rolled steel business, he shapes sheet sales policy.



The nerve center for processing and servicing your sheet steel orders in the Pittsburgh Steel general offices is headed by Frank Grunewald (right). In discussion with him are W. W. "Wib" Williams (center), and E. R. "Dick" McKinstry, sheet sales engineers.



On the firing line—Across the table from a purchasing agent is Pittsburgh district salesman, J. E. "Joe" Connell, discussing details for a sheet steel order. Joe is typical of Pittsburgh Steel salesmen calling on customers and prospects.



Hot-rolled sheets, custom built to customer's specifications, are given a temper pass to impart desired surface finish on this latest model temper mill at the new hot-sheet mill at Allenport, Pa. Each sheet order at Pittsburgh Steel Company begins with the selection of the most desirable raw materials; the best grades of iron ore, coke, and limestone that will make the finished sheet steel perform better in production and in ultimate end use.

Pittsburgh Steel Company is now firmly rooted in the flat-rolled steel business. Its brand new $28-million, 66-inch hot-rolled sheet mill is rolling out thousands of tons of sheet steel. And before year's end, the company expects to start up a spanking new cold-rolled sheet mill.

To back them up, the salesmen have a capable crew of rolling mill men operating their new machines. Alert metallurgists are checking quality at every process along the line from selection of the best raw materials to finished hot-rolled steel. The sheets rolled on this new mill are clean and free from surface defects, and have physical qualities as excellent as modern advances in science can produce.

That's why the men who are responsible for selling the products of this mill are eager to show what they can do for you.

What to look for—Good steel salesmen are made, not born. They must, like all good salesmen, have sales instinct, business ability, initiative and persistence and a thorough knowledge of their products and processes. In order to do a thorough job for customers, they must know the customer's problems, what he manufactures and his production methods.

Those are some of the reasons why it takes a long time to make a good steel salesman. And they are also the reasons why the men in Pittsburgh Steel's sheet sales department are ready to compete for their share of the sheet steel business.

The job of a Pittsburgh Steel salesman involves a lot more than persuading purchasing agents to buy the company's products. A salesman observes market conditions, he is aware of technological developments in the uses of steel and ready to answer questions and inquiries. He learns to understand the needs of customers and prospects, takes orders to meet production-line requirements, sees the order through to the customer's satisfaction. He does all of this and offers a lot more services that make him a valuable adjunct to your business.

If you use flat-rolled steel in the products you manufacture and you have a problem in the selection and use of carbon steel sheets, a Pittsburgh Steel salesman would appreciate the opportunity to demonstrate how he can deliver hot-rolled sheet steel exactly as you want it.

For a complete description of Pittsburgh Steel's new hot-sheet mill at Allenport, Pennsylvania, ask for your free copy of their 20-page brochure "Rolling Your Way." Also available is a 16mm sound motion picture in black and white entitled "Rolling Your Way": running time—13 minutes.



Four Packages to a Car—These wrapped coils of sheet steel are being anchored to the car floor for rail shipment. Other shipments of both coils and sheets go to customers over the highways by truck and down the rivers by barge.

"Everything New But The Name"

Pittsburgh Steel Company

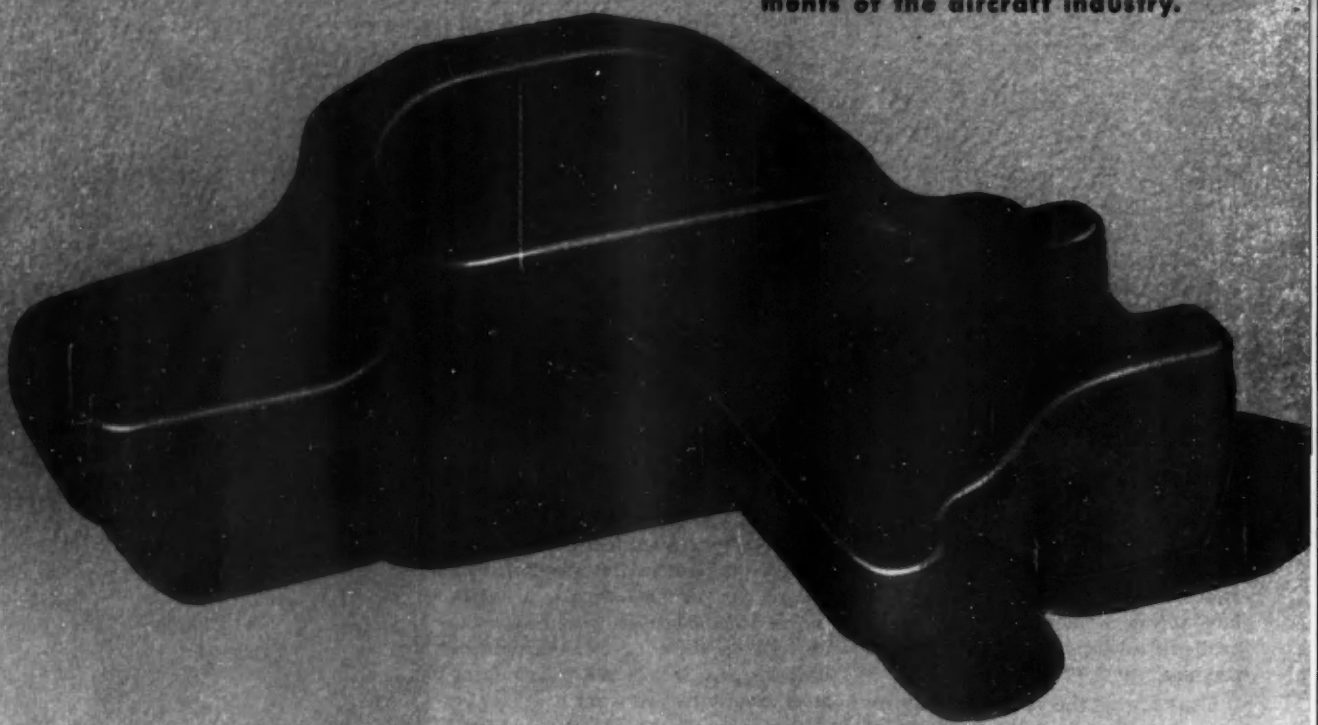
Grant Building • Pittsburgh 30, Pa.

Sales Offices in Principal Cities Throughout the Country

TRANSUE FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY

Aircraft forging weighs 29 lbs. This forging is typical of T & W ability to produce the exacting requirements of the aircraft industry.



Consult our engineers when you are contemplating conversion to forgings or when you are in need of reliable forging service.

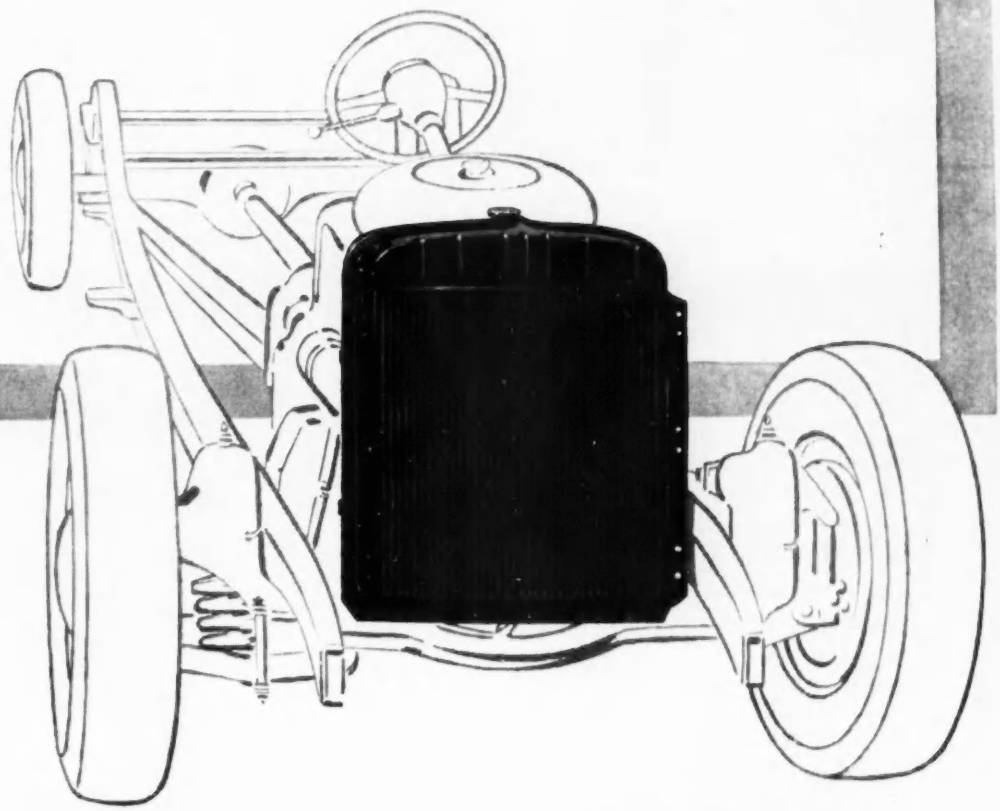
TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

Out front in automotive cooling



HARRISON
RADIATOR
DIVISION
GENERAL MOTORS CORPORATION,
LOCKPORT NEW YORK

HARRISON

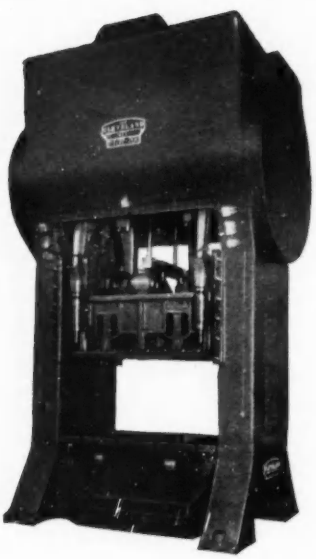


PURCHASING

has competition got you worried?

THEN take a good look around your plant! Study your machinery production records! You may need to weed out and replace costly over-age equipment that's often down for repairs and adjustment, for your best answer to stiffening competition is utmost machine efficiency. Presses are no exception!

If you use presses, let a Cleveland Engineer show you how rugged Cleveland Presses will improve your operating economy. Available in a complete selection of types and sizes, modern Cleveland Presses feature *sturdy frames, extra long gibbing* and the revolutionary *Cleveland (patented) Drum Type Friction Clutch.* Write or call today!



THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

CLEVELAND 14 • OHIO

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING

Wagner Air Brakes...

"maintain uniform dependable service that's *safe* and *sure*..."



says: Stanley V. Osman

Purchasing Agent

SCHERER FREIGHT LINES, INC., OTTAWA, ILLINOIS

With WAGNER AIR BRAKES on the vehicles you manufacture users are assured of safety-tested perfection that's backed by over twenty-five years' experience in manufacturing brakes and complete brake systems. They can enjoy the same assurance of safety and lower maintenance costs as Stanley V. Osman of Scherer Freight Lines, Inc., reports.

Wagner Air Brakes are now available as original equipment from leading manufacturers of trucks and buses. These manufacturers know that the ever-increasing demand by transport operators requires them to install an air brake system that's safe... sure... and economical to operate—that's why so many prefer WAGNER.

Take a tip from men like Stanley Osman —Get all the facts. It will pay you to include Wagner Air Brakes as standard equipment on the vehicles you manufacture. Write today for complete information and free copy of Bulletin KU-201A.

Scherer FREIGHT LINES, INC.

GENERAL OFFICES
OTTAWA, ILLINOIS

400 SCHERER TRUCKS AND TRAILERS — SERVING OVER 400 COMMUNITIES

Wagner Electric Corporation
6400 Plymouth Avenue
St. Louis 14, Missouri

October 2, 1952

Gentlemen:

As purchasing agent for Scherer Freight Lines, Inc., I check with our drivers and mechanics to find out what equipment is best suited for their needs. When it comes to air brake systems used in our operation, they agree that Wagner Air Brakes maintain uniform dependable service that's safe and sure and also require little or no maintenance in our shop.

Quentin Pletsch, our superintendent of Maintenance, reported that he hasn't had a single case of road failure or repair trouble on some units equipped with Wagner Air Brakes that have passed the 100,000 mile mark of profitable hauling.

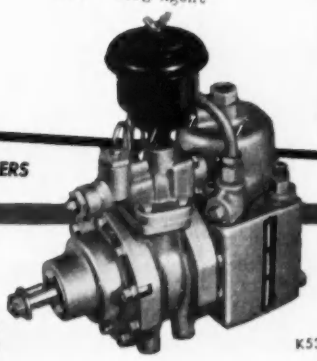
My reasons for specifying Wagner Air Brakes when ordering new equipment is because our past experience shows that Wagner Air Brakes help us lower maintenance expenditures. Our drivers feel safe because they know they have adequate stopping power at all times.

Sincerely,

Stanley V. Osman
Purchasing Agent

SVO hk





WAGNER AIR BRAKE USERS ARE OUR BIGGEST BOOSTERS

Wagner Electric Corporation

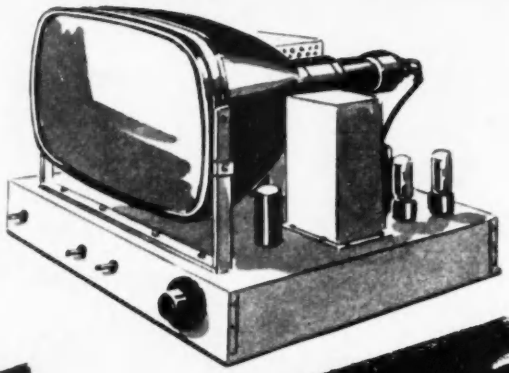
6363 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.
(Branches in Principal Cities in U. S. and in Canada)

LOCKHEED HYDRAULIC BRAKE PARTS and FLUID... NoRoL... CoMaX BRAKE LINING... AIR BRAKES... TACHOGRAPHS... ELECTRIC MOTORS... TRANSFORMERS... INDUSTRIAL BRAKES

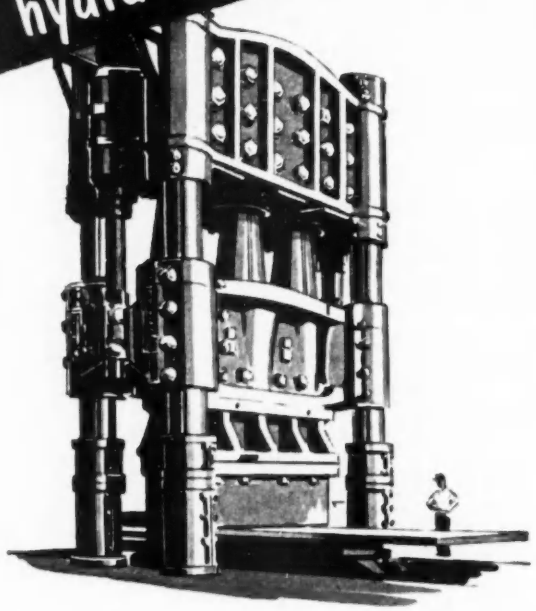
K53-4A

APEX - specialists in nut running





from television to hydraulic presses



APEX sockets fit the job!

Apex straight sockets, weighing less than an ounce, are used to run 3/16" hex nuts in assembling TV sets.

Apex straight sockets, weighing up to 237 pounds, are used to run 10⅝" hex nuts in maintenance work on hydraulic presses.

Between these two extremes are more than 5,000 stock types and sizes of Apex sockets, extensions, adapters and universal sockets, among which you should find several exactly fitted to your requirements. If not, then Apex can most likely build the specials you need.

Either way, stock or special, you're sure to save time and money on nut running operations when you use Apex nut running tools.

CATALOG 29—lists the complete line of Apex nut running tools. Write, on your company letterhead, please, for your copy. For specials, send sketch or blueprint for prompt quotation.

APEX TOOLS

sockets, extensions, universal sockets

THE APEX MACHINE & TOOL COMPANY

1043 S. Patterson Blvd., Dayton 2, Ohio



Where Pennies Pay Off...

$600 to $800 A WEEK

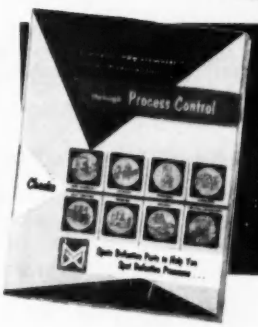
These men are inspecting rough forged connecting rods with Magnaglo* to find invisible cracks.

By finding these defects in forgings and castings *in the rough,* this company obtains direct savings in machining time and labor of $600 to $800 a week. The cost is *only a penny or pennies per part,* spent for Magnaglo inspection!

It costs least to salvage rough parts, or scrap them . . . and to correct the process that causes the defect. Here is just one example out of hundreds in which inspection methods by Magnaflux are cutting costs by finding defects.

How about your operations? If you don't know quality *in advance,* you may be wasting processing time, labor and money.

You can know, through inspection and "correctioneering" by Magnaflux' non-destructive testing methods. You'll get your answer at production speeds. You can do it either with your own equipment, or by using our nearest inspection laboratory service!



Write for informative booklet, "Finding the HOW and WHERE of Lower Production Costs." Free upon request.

*Magnaflux and Magnaglo are U. S. registered trademarks of Magnaflux Corporation.

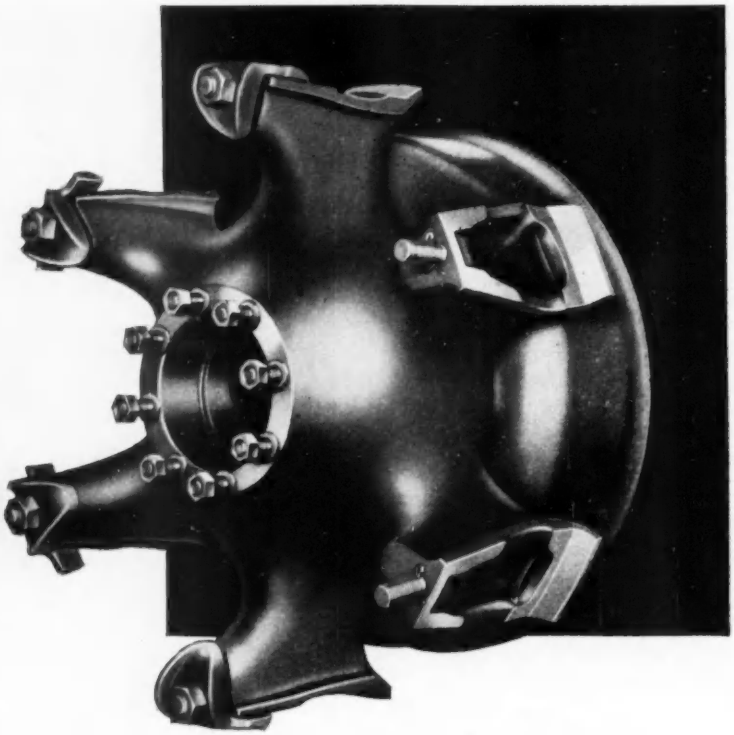
MAGNAFLUX

DETECTS DEFECTS

Reg. U. S. Pat. Off

MAGNAFLUX CORPORATION
7304 W. Lawrence Avenue, Chicago 31, Illinois
New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11
Dallas 9 • Los Angeles 58
Export Distributor: Curtiss-Wright Corp.
In Canada: Williams & Wilson, Ltd.

GUNITE WHEELS



Take Bigger Loads Over Rougher Roads

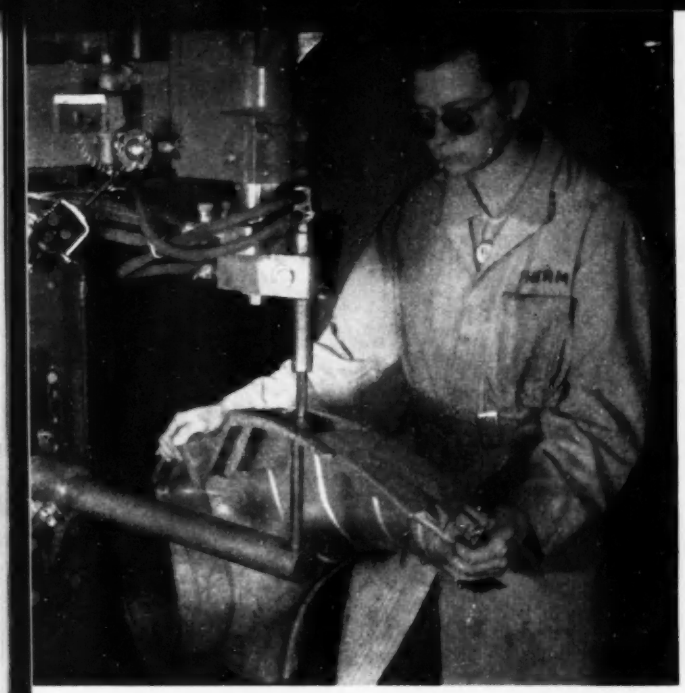
● . . . save vital pounds, too!

There are two important reasons why Gunite truck and trailer wheels provide dependable heavy-duty service . . . while assuring minimum unsprung weight. One is the *metal* . . . precisely controlled castings are used to make Gunite wheels strong and rigid . . . ready to withstand the toughest road abuse. The other is Gunite's *tubular spoke design* . . . which creates maximum strength through accurate weight distribution • Gunite tubular-spoke wheels are rugged . . . yet, save vital pounds . . . cut per mile operating costs. Six low-torque floating rim bolts eliminate servicing headaches. Specify Gunite lightweight cast-steel wheels for your rigs.

They'll save you money at no premium in price.

GUNITE

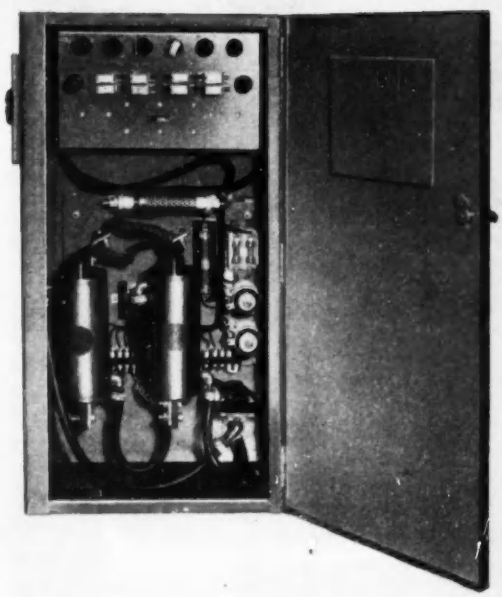
GUNITE FOUNDRIES CORPORATION, Rockford, Illinois





WHETHER YOU'RE WELDING 2 PIECES OR 199...

G-E Resistance Welding Controls Make Faster, More Accurate Welds



TYPICAL PANEL is neat, compact. Advanced circuit design is result of long experience in control design and manufacture. Spot-welding panel above is non-synchronous NEMA Type N2.

The occasion probably will never arise when you'll have to weld 199 pieces of metal together, but you could—with G-E controls.

SINCE 1888, when Elihu Thomson developed the first resistance welding transformer, G-E engineers have been designing welding controls for all production requirements. Whether your operation demands speed or accuracy or both, specify G-E control. G.E.'s complete line includes synchronous-precision, nonsynchronous, three-phase, and all special-purpose accessories for all welders.

FOR MORE INFORMATION, contact your nearby G-E Apparatus Sales Office or welding machine manufacturer or his agent, or write:

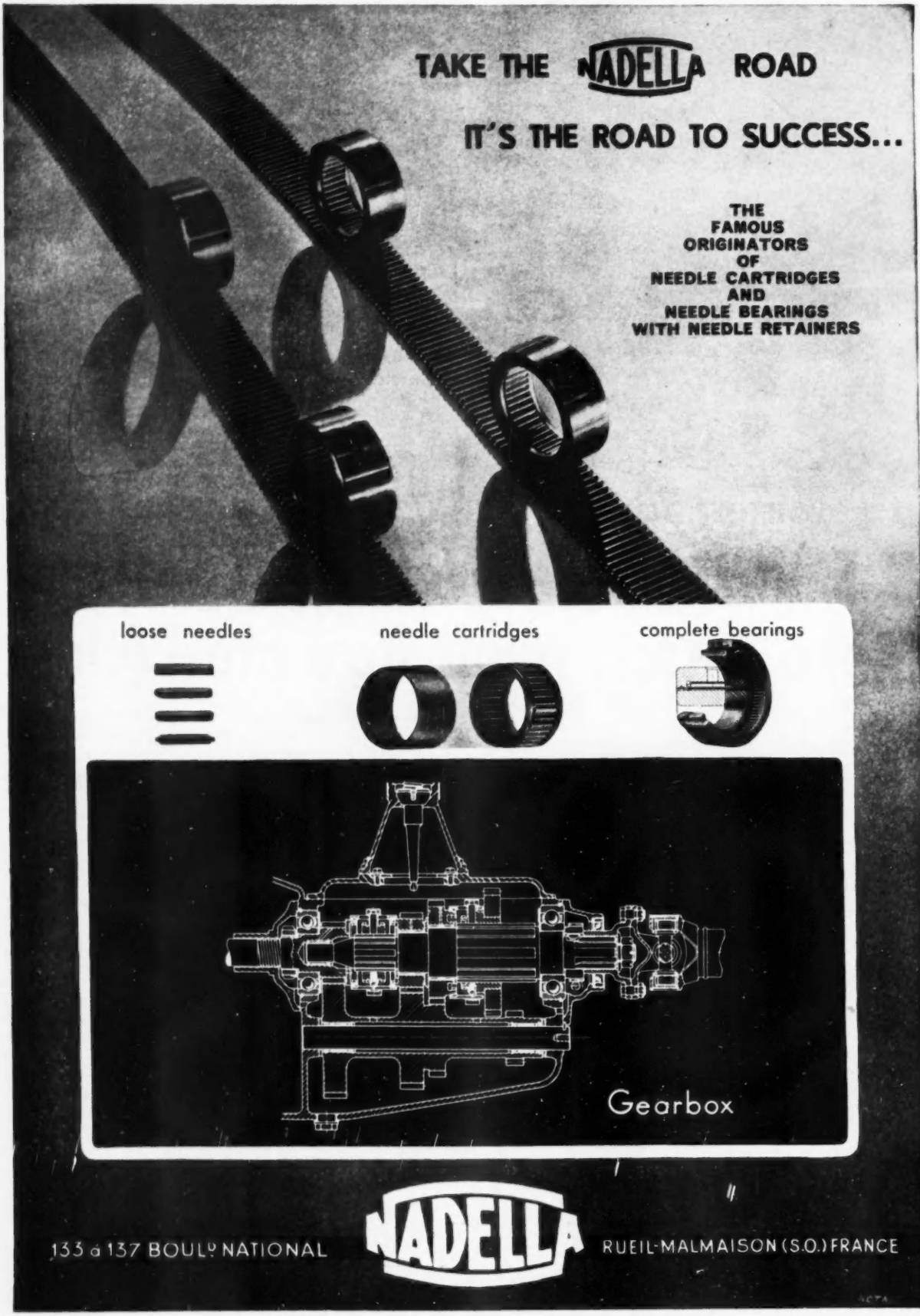
Section C785-7,
General Electric Company
Schenectady 5, New York

Please send the following bulletins:

☐ **GEA-5816,** "The Story of Resistance Welding": theory behind the process and complete description of all G.E.'s controls.
☐ **GEA-5945,** "Synchronous-Precision Control."

NAME ..... **TITLE** .....
COMPANY .....
ADDRESS .....
CITY ..... **STATE** .....

GENERAL ELECTRIC


TAKE THE NADELLA ROAD
IT'S THE ROAD TO SUCCESS...
THE FAMOUS ORIGINATORS OF NEEDLE CARTRIDGES AND NEEDLE BEARINGS WITH NEEDLE RETAINERS
loose needles
needle cartridges
complete bearings
Gearbox
133 à 137 BOULd NATIONAL
NADELLA
RUEIL-MALMAISON (S.O.) FRANCE

THE JOBS PROVE IT

YOU RETRENCH ON STAMPING COSTS WITH HENRY & WRIGHT DIEING MACHINES

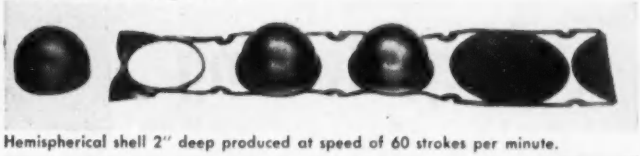
In the small area occupied by a compact Henry & Wright Dieing Machine you have a production tool equal in capacity to five or ten conventional presses. Progressive stamping on a Henry & Wright really pays off, because this press is specifically designed for this type of work.

Angular thrust is not transmitted to the upper crosshead. Low center of gravity holds vibration to an absolute minimum. Long ways, plus four post guidance and a pulling instead of pushing stroke, serve to strait-jacket punch travel. Accurate punching produces high quality work and a lot more of it between die grinds. Much less metal is removed when dies are ground.

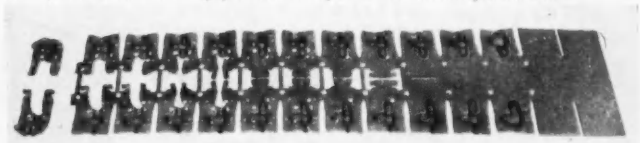
Get the whole story about the Henry & Wright Dieing Machine – the economies you achieve in die life, inspection, toting, operators. Retrench by modernizing with Henry & Wright.



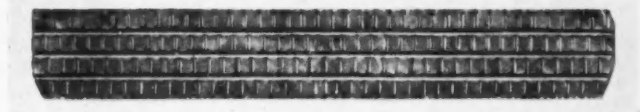
Refrigerator part produced at speed of 65 strokes per minute of .060" cold rolled steel on 100-ton Dieing Machine.



Hemispherical shell 2" deep produced at speed of 60 strokes per minute.



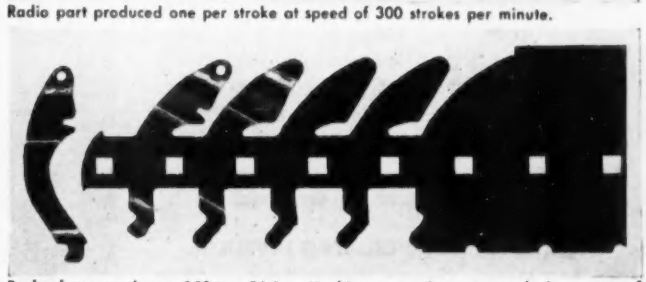
Paired sections of housing produced of .065" hot rolled steel at 60 pairs per minute.



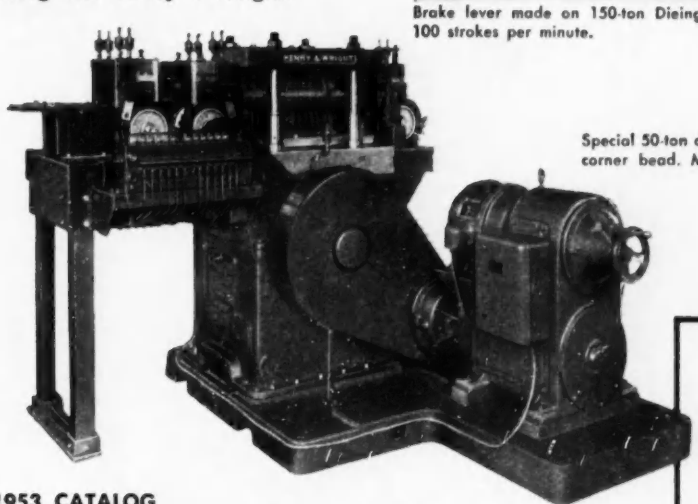
Radiator fin of copper made three at a time at speed of 85 strokes per minute.



Radio part produced one per stroke at speed of 300 strokes per minute.



Brake lever made on 150-ton Dieing Machine operating at speeds in excess of 100 strokes per minute.



Special 50-ton dieing machine for production of expanded corner bead. Machine operates 620 strokes per minute.



1953 CATALOG

Write for your copy on company letterhead to Henry & Wright, Division of Emhart Mfg. Co., 491 Windsor St., Hartford, Conn.

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

Only the best is good enough

Icy, slashing winter storms can mean trouble- even disaster!



It's not always snow, sleet and ice. Frigid rain flooding through *ordinary* seals to discomfort the driver of the bus or truck . . . can *distract* him so completely that a disastrous crash may well result.

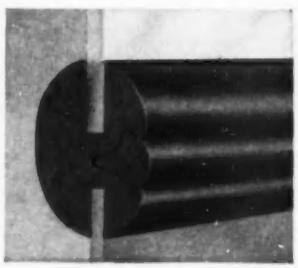
But NOT where Inland Self-Sealing Weather Strip is used! Its *natural* sealing principle . . . assures complete weather protection at *every* point. That's why so many trucks, buses, cars, other vehicles and structures, use Inland Self-Sealing Weather Strip.

Inland Self-Sealing Weather Strip is best for the *builder* . . . a fast, one-man, low-cost installation. And best for the *user* . . . long-lived, trouble-free, inexpensive when replacing broken glass.

INLAND MANUFACTURING DIVISION
General Motors Corporation • Dayton, Ohio

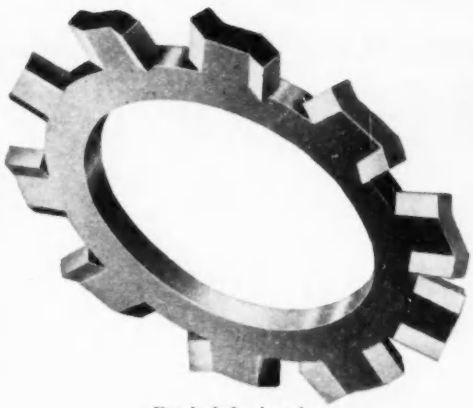
Here's how it works!

Inland Self-Sealing Weather Strip goes into body panel or other opening . . . glass into Strip . . . filler strip into locking channel. A *compression seal that's complete and permanent.*

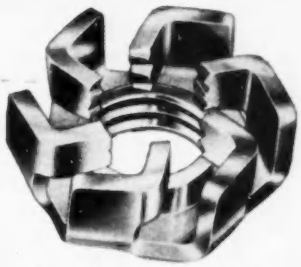


INLAND MANUFACTURING

Self-Sealing WEATHER STRIP



Everlock Lockwashers



New "Spin-Down" Locknuts



Everlock Screw & Lockwasher Assemblies



Everlock Terminals

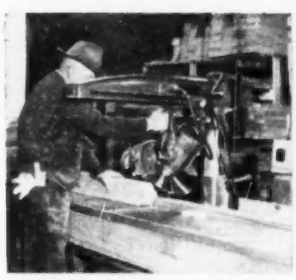
AMF EVERLOCK* FASTENERS

...on in an instant—to stay a lifetime

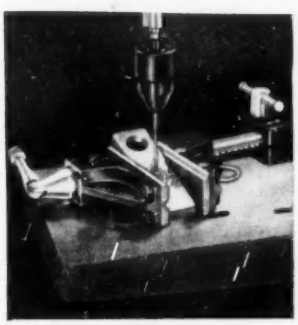
Automotive assemblies stay securely held in the grip of AMF Everlock "Chisel Edge" Lock Washers. Made by AMF Subsidiary, Thompson-Bremer & Company, these double-edge, multiple-bite washers have successfully fought vibration in millions of passenger and commercial vehicles.

Newest member of the Thompson-Bremer family is the AMF Everlock Locknut. This one-piece, all-metal nut spins down finger-free, locks securely with a twist of a wrench or power tool. This new fastening development is another example of how AMF products help the automotive industry. The Everlock Locknut effects savings in purchasing, handling and speed of assembly. Other AMF products are illustrated below. Your inquiries are invited. Address AMERICAN MACHINE & FOUNDRY CO., General Products Group, 511 Fifth Avenue, New York 17, N. Y.

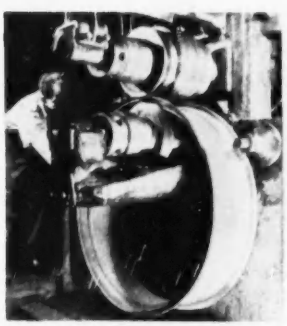
Detroit Representative: Mr. Sam Keller, 2457 Woodward Avenue, Detroit, Mich.



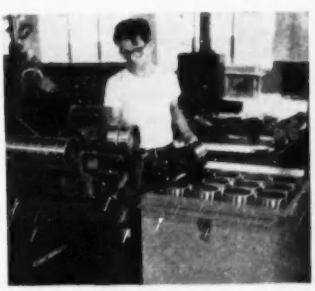
SHIPPING AND MAINTENANCE departments find AMF De Walt* Power Saws save time in all wood-cutting operations.



AMF WAHLSTROM* Fully-Automatic Chucks and AMF FLOAT-LOCK Instant-Change Safety Vises speed tool set-up changes.



MAJOR SUPPLIER of rims and circular weldments for the Automotive Industry is AMF's Cleveland Welding Company.



AMF INDUSTRIAL LOWERATOR* DISPENSERS store and position planned quantities of parts in process at efficient working levels.

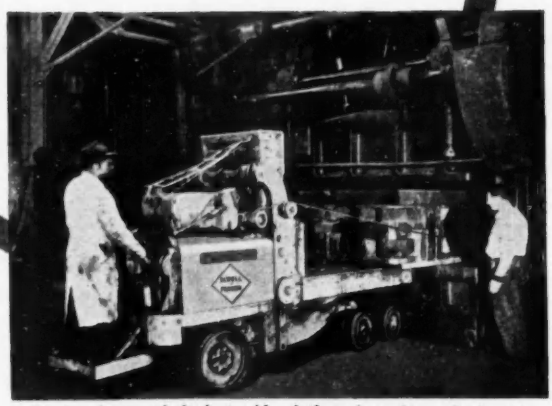
AMF products ARE BETTER...*by design*

AMERICAN MACHINE & FOUNDRY COMPANY

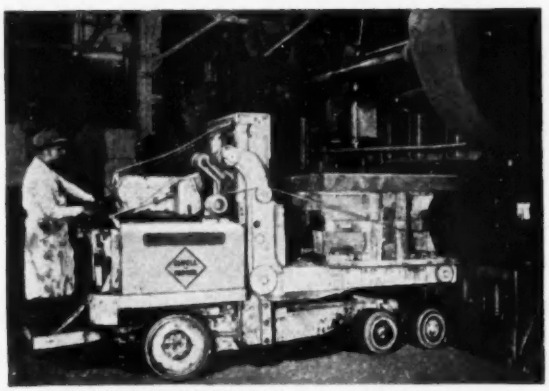
*Registered Trademark



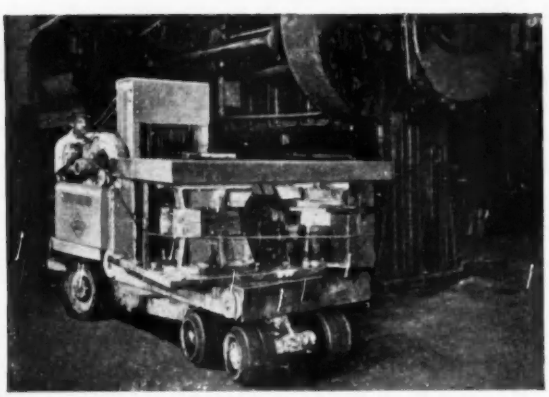
ELWELL-PARKER TRUCK pulls 17 ton die from press in 10 minutes!



Die has been unbolted—truck's platform brought up flush with press bed. Cable placed around die and winch motor started.



Die slides smoothly off bed of press onto truck's platform.



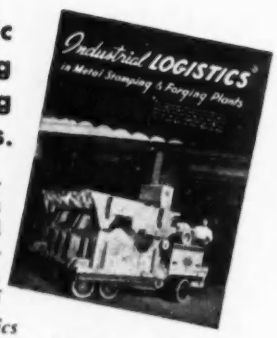
With cable still holding die securely, truck is backed away and die is on the way to storage. *Elapsed time—10 minutes!* Reverse operation delivers and places new die in press.

These sequence photographs, taken during a routine change of an automotive stamping die, graphically demonstrate the advantages of an Elwell-Parker die handler: 1. SPEED—Rapidity of the operation greatly reduces labor costs and idle press time. 2. SAFETY—Numerous safety controls give operator thorough protection. He is completely the master of the truck at all times. 3. STRENGTH—The super-quality built into these trucks enables them to withstand such grueling service for years—indeed, this truck has proven itself a dependable accessory to a battery of presses for 18 years. (E-P trucks handle even heavier dies.)

You, too, can benefit—have an experienced E-P man "tailor" this equipment to your specific needs. The Elwell-Parker Electric Company, 4119 St. Clair Avenue, Cleveland 3, Ohio.

Free Booklet—

describes Scientific Materials Handling in Metal Stamping and Forging Plants.



Here is concrete, illustrated evidence that you can save more time and money when using Elwell-Parker Die Handlers. Write now for your copy of *"Industrial Logistics in Metal Stamping and Forge Shops"*.

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

Established 1893

WHY IT PAYS TO BUY STEEL FROM WAREHOUSE



You don't lose production time waiting for steel!

WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

- LOWER INVENTORY COSTS
- LOWER SPACE COSTS
- LOWER TIME COSTS
- LOWER CAPITAL INVESTMENT
- FASTER PRODUCTION
- FEWER INVENTORY LOSSES

You don't have to adjust your production schedule to match mill rollings when you use a U. S. Steel Supply warehouse as your own. We can make deliveries to suit *your* convenience. The stocks in our *local* warehouse and the resources of our 14 other warehouses promise delivery of the steel you need when, where and in the condition you want it. Contact your U. S. Steel Supply salesman.

U. S. STEEL SUPPLY

DIVISION

General Office
208 So. La Salle St., Chicago 4, Ill.

USS

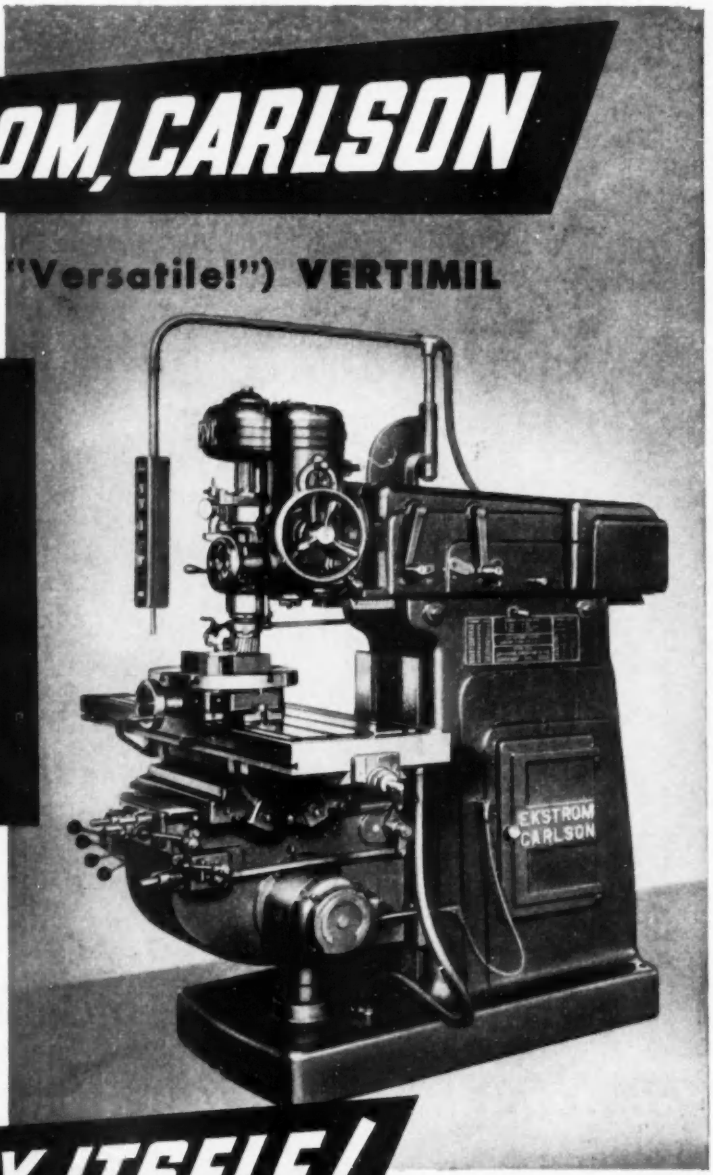
Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

EKSTROM, CARLSON

No. 5V (for "Versatile!") VERTIMIL





POWER CROSS FEED

POWER VERTICAL FEED
(SPINDLE AND KNEE)

POWER LONGITUDINAL FEED

TILTING TABLE

TILTING SPINDLE

IN A CLASS BY ITSELF!



Write for full details Bulletin 5-V

EKSTROM, CARLSON & CO.
1400 Railroad Ave.
Dept. A-3
Rockford, Ill.

ECCO

Yes, for all types of toolroom work and many kinds of production work, this machine is *hard to beat!* Ekstrom, Carlson engineers have built into this *one* sturdy machine features which make possible the machining of *compound angles* without shifting the work and without special tooling. The machine also is excellent for precision boring, drilling, and milling.

Rapid traverse, broad spindle speed range, spindle motors up to 25 hp, and centralized controls — all add up to more work at less cost. Investigate today!

MANUFACTURERS OF MACHINERY AND TOOLS SINCE 1904

NATIONAL OIL SEAL LOGBOOK

Write our Redwood City office for reprints of this Logbook page

Sealing News & Tips

How Dart uses National O-Rings in front end suspension of 60-ton truck

Among the many unusual features of the new Dart 60-ton dump truck is the air-hydraulic suspension system for the front axle.

As the dual 18.00 x 25 tires roll into a depression, the fixed piston (Figure 2) moves downward. This forces S.A.E. #30 mineral oil from the piston chamber to the hollow piston and compresses captive air above the oil level. As the truck's weight presses downward, the operation is reversed. In both cases, counter-pressure between air and oil absorbs road shocks.

To insure zero leakage sealing in this demanding application, four National O-Rings are employed. Three O-Rings seal various piston or cylinder parts, and a fourth seals the oil intake valve. O-Ring diameters range from approximately 16" on the piston cap to 1" on the intake valve. O-Rings are all conventional National synthetic rubber O-Rings, designed to withstand temperatures up to 300° F and pressures to 1,500 p.s.i.

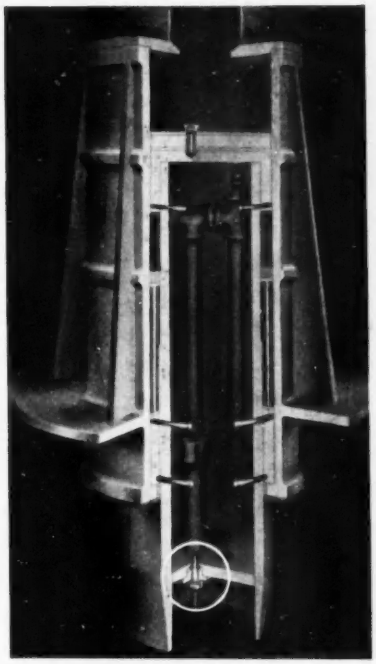


Figure 2. Dart Front End Suspension Unit



Figure 1. Dart Model 60 Truck

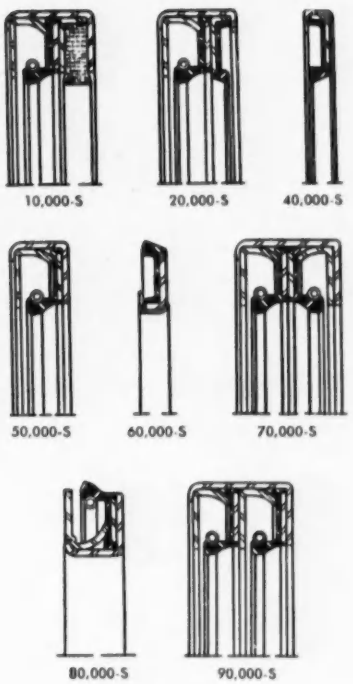
Standard-design National Oil Seals with single and dual spring-tensioned sealing lips (Figure 3) are also utilized in the truck—particularly in the wheel bearing assembly, planetary clutches and twin 350-horsepower engines.



Figure 3. National 50,000 (left) and 10,000 spring-tensioned leather oil seals

Precision-made National Oil Seals and O-Rings are available in thousands of standard types and sizes. If conventional units do not precisely suit your application, modified or special seals can be designed. Call the factory-trained National Applications Engineer nearest you for complete information.

Standard-design National Syntech* Oil Seals are widely used for zero leakage operation in applications where intermittent temperatures reach 300° F, speeds reach 3,600 F.P.M., and total indicator runout reaches .030. These basic designs employ tough, accurately manufactured steel outer cases, precision-tensioned springs and accurately molded and trimmed Syntech sealing lips unaffected by water, most lubricants, detergents or industrial fluids.



"Let Your Decision be Based on Precision"

NATIONAL
OIL & GREASE SEALS
O-RINGS SHIMS

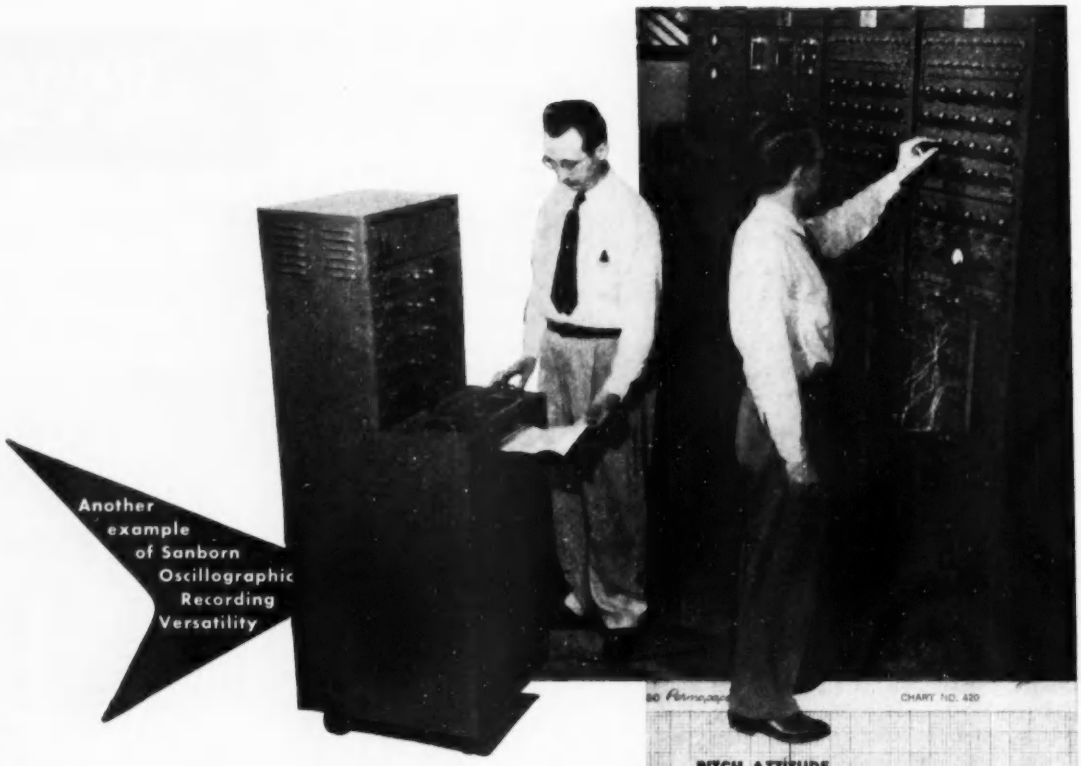
NATIONAL MOTOR BEARING CO., INC.
General Offices: Redwood City, California
Plants: Redwood City, Calif.; Downey (Los Angeles County), Calif.; Van Wert, Ohio

*T. M. Reg.

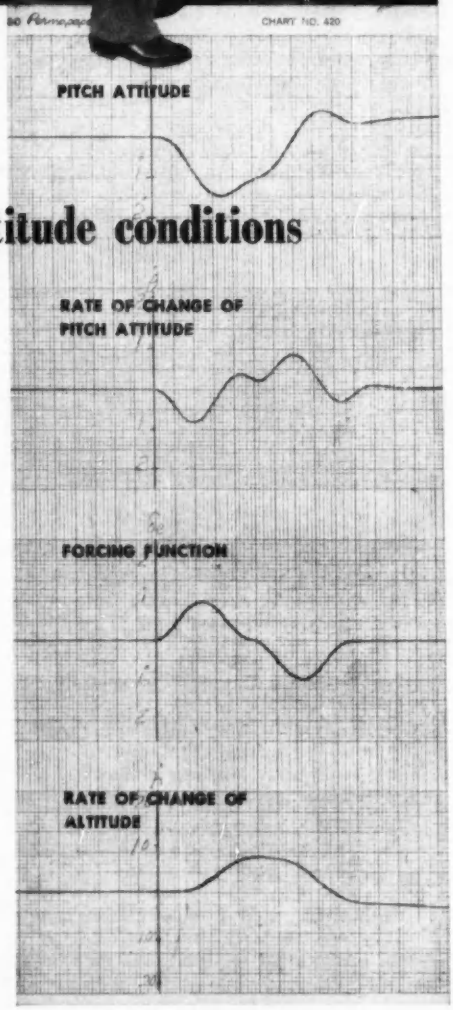
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MILWAUKEE, WIS. . . *647 West Virginia Street, BRoadway 1-3234*
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Another example of Sanborn Oscillographic Recording Versatility



Four-channel recording correlates simulated jet bomber airspeed and altitude conditions

At Eclipse-Pioneer, engineers make good use of Sanborn 4-channel recording systems in conjunction with high precision analogue computers to establish performance criteria for automatic flight systems and components.

At other laboratories Sanborn Systems are being used to record such phenomena as: stress, strain, pressure, displacement, thickness, velocity, acceleration, current, voltage, temperature, torque, light, flow, force, load, position, rpm, radiation and tension.

SANBORN OSCILLOGRAPH RECORDING SYSTEMS HAVE MANY APPLICATIONS. They are used in a great many different fields where accurate and permanent graphic registration of almost any electrical phenomena (whose frequency range is zero to 100 cycles per second) is required.

Sanborn Systems are widely used because of the availability and ready interchangeability of amplifiers and preamplifiers, as well as such Sanborn advantages as: inkless recording in true rectangular coordinates, high torque movement, time and code markers and wide choice of paper speeds. In addition, a basic choice of systems, 1-, 2-, and 4-channels, provides a system to fulfill almost any laboratory requirements.

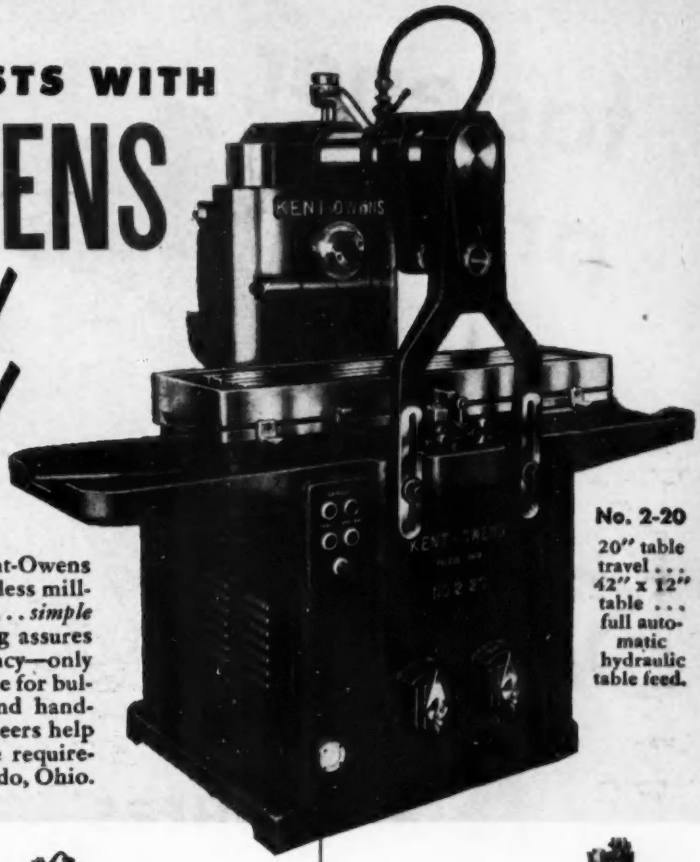
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Sanborn Company
INDUSTRIAL DIVISION
CAMBRIDGE 39, MASSACHUSETTS, U.S.A.

CUT MILLING COSTS WITH

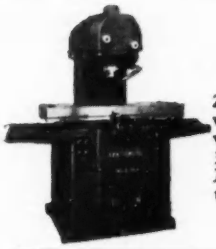
KENT-OWENS

Speed and Accuracy!

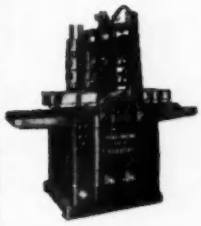


No. 2-20
20" table travel . . . 42" x 12" table . . . full automatic hydraulic table feed.

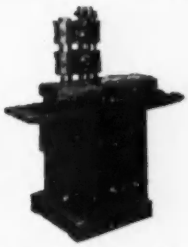
More and more—Kent-Owens Machines get the call for countless milling jobs today—because they're *rugged . . . simple . . . versatile.* Twin-post head mounting assures balanced load. Greater cutting efficiency—only two gear contacts, motor to cutter. Write for bulletins on wide range of hydraulic and hand-operated machines. Also, let our engineers help you with tooling and special machine requirements. Kent-Owens Machine Co., Toledo, Ohio.



No. 2-20V
20" table travel... vertical spindle with speed range 32 to 1284 R.P.M.... 42" x 12" table.



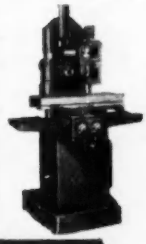
No. 2-20DS
Double Spindle for two milling operations at same time... 20" table travel . . . 42" x 12" table.



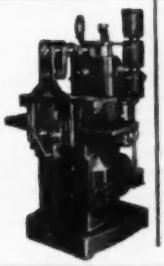
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Double Spindle for two milling operations at same time . . . 14" table travel . . . 32" x 9" table.



No. 1-M
Hand feed to table and head . . . 25" x 9" table . . . Adjustable head counter-balance.



No. 1-V
Hydraulic vertical head feed... 5¼" head travel . . . 25" x 9" table.



No. 1-8
8" table travel . . . 25" x 9" table . . . automatic hydraulic table feed.



No. 1-14
32" x 9" table . . . 14" table travel . . . hydraulic table feed . . . full automatic cycle.

Call on KENT-OWENS for milling machines

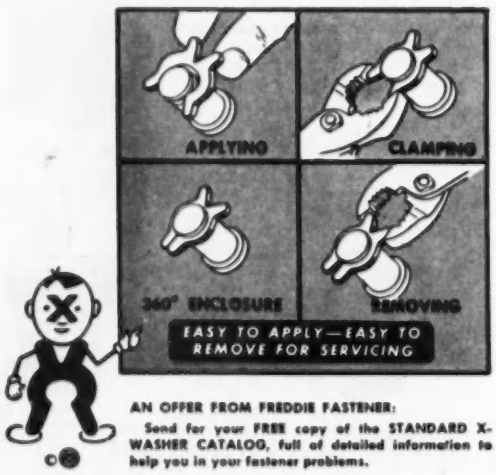
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GRAND RAPIDS — Joseph Monohon
HAMILTON, ONT — F. F. Barber Mach'y Company
HARTFORD — Harrington Machinery, Inc.
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LOS ANGELES — Germain Mach'y Co.
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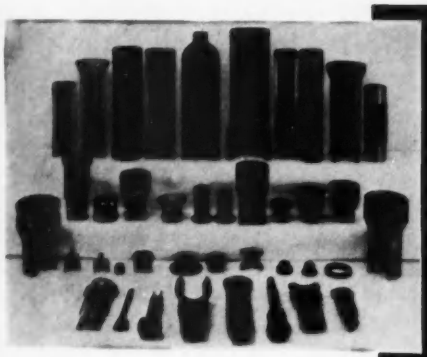
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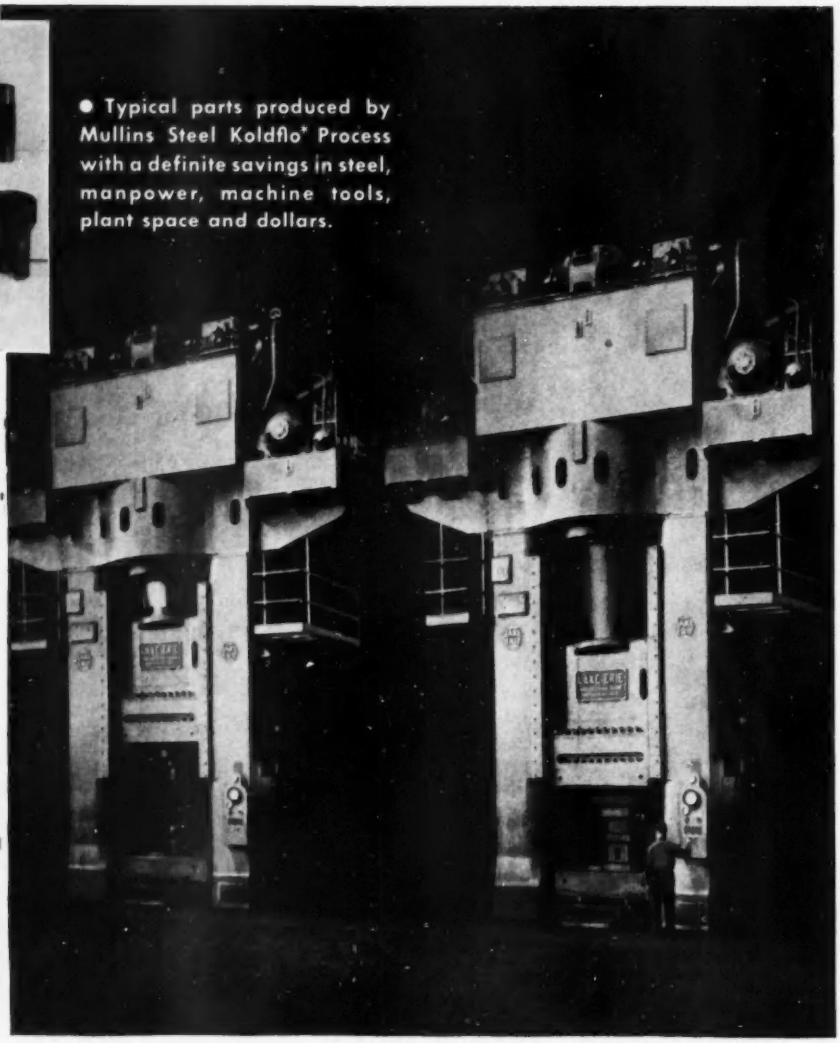
MAIN OFFICE AND MANUFACTURING PLANTS

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● Typical parts produced by Mullins Steel Koldflo* Process with a definite savings in steel, manpower, machine tools, plant space and dollars.

WORLD'S FIRST COMMERCIAL FACILITY



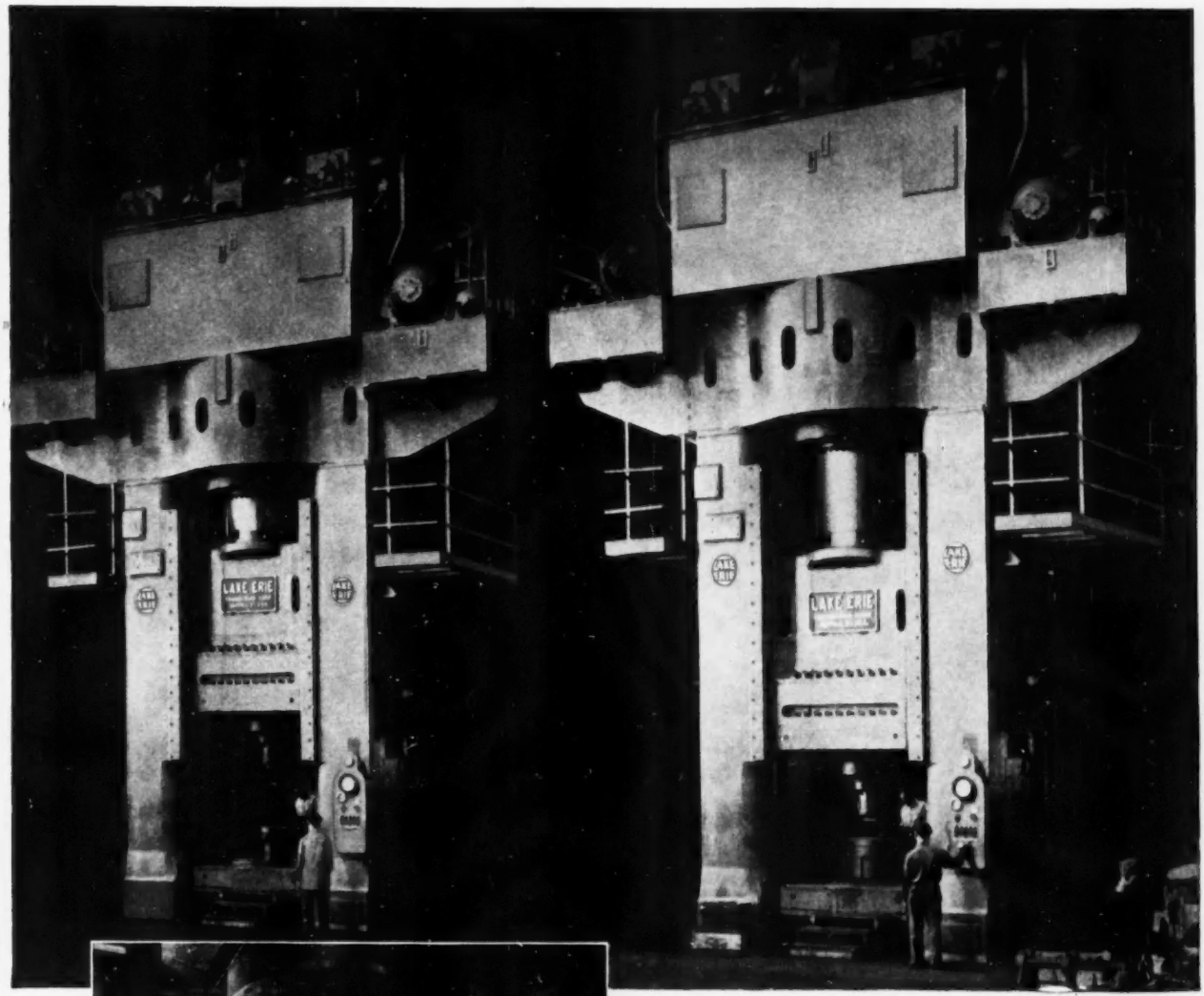
for producing parts by MULLINS STEEL Koldflo* Process

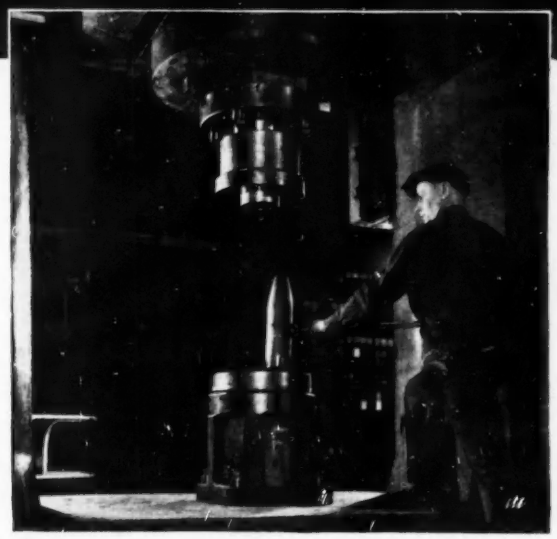
This new facility of the Mullins Manufacturing Corporation makes available to American Industry for the first time the economies and other advantages of Koldflo* production. It is a process in which parts are cold-formed into hollow shapes with a wide variety of configurations and in lengths from 6″ to 36″ with diameters from 2″ to 6″. The finished products come from the presses with smoothness, hardness, strength and precision. All of these desirable features are obtained by this process while using low carbon, low cost steel.

MAIN BATTERY OF PRESSES FURNISHED BY LAKE ERIE

These four 3,000-ton hydraulic presses weigh over 700,000 pounds each. They stand 33′-3″ above the floor and extend 6′-7″ below the floor. Beds measure 72″ x 60″, daylight openings are 96″ and strokes 48″. The high-speed, self-contained pumping units on each press are powered by 750 HP motors. This installation is another excellent example of Lake Erie's ability to construct hydraulic presses for any process or manufacturing requirement.

*Koldflo is a trade-mark of Mullins Manufacturing Corporation.





FIRST PRESS PRODUCED IN THE UNITED STATES SPECIFICALLY FOR THE COLD EXTRUSION OF STEEL

Close-up view of the original 3,000-ton Lake Erie "laboratory" press purchased by Mullins in 1949 for Koldflo* development and production. Outstanding performance of this press led to the selection of Lake Erie equipment again for the main battery in Mullins' new commercial installation. There can be no better evidence than this of customer confidence and satisfaction.

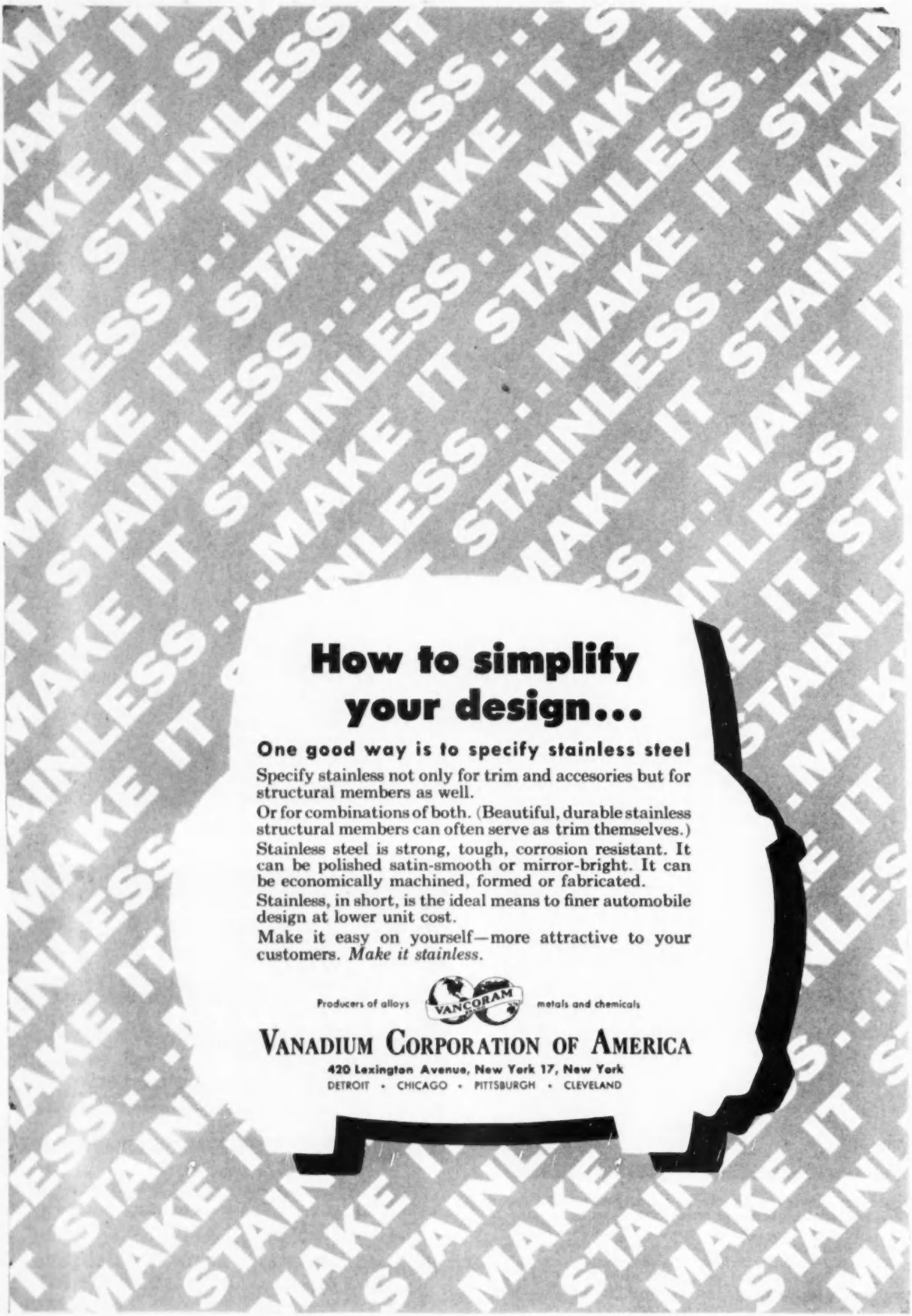
LAKE ERIE
HYDRAULIC PRESSES

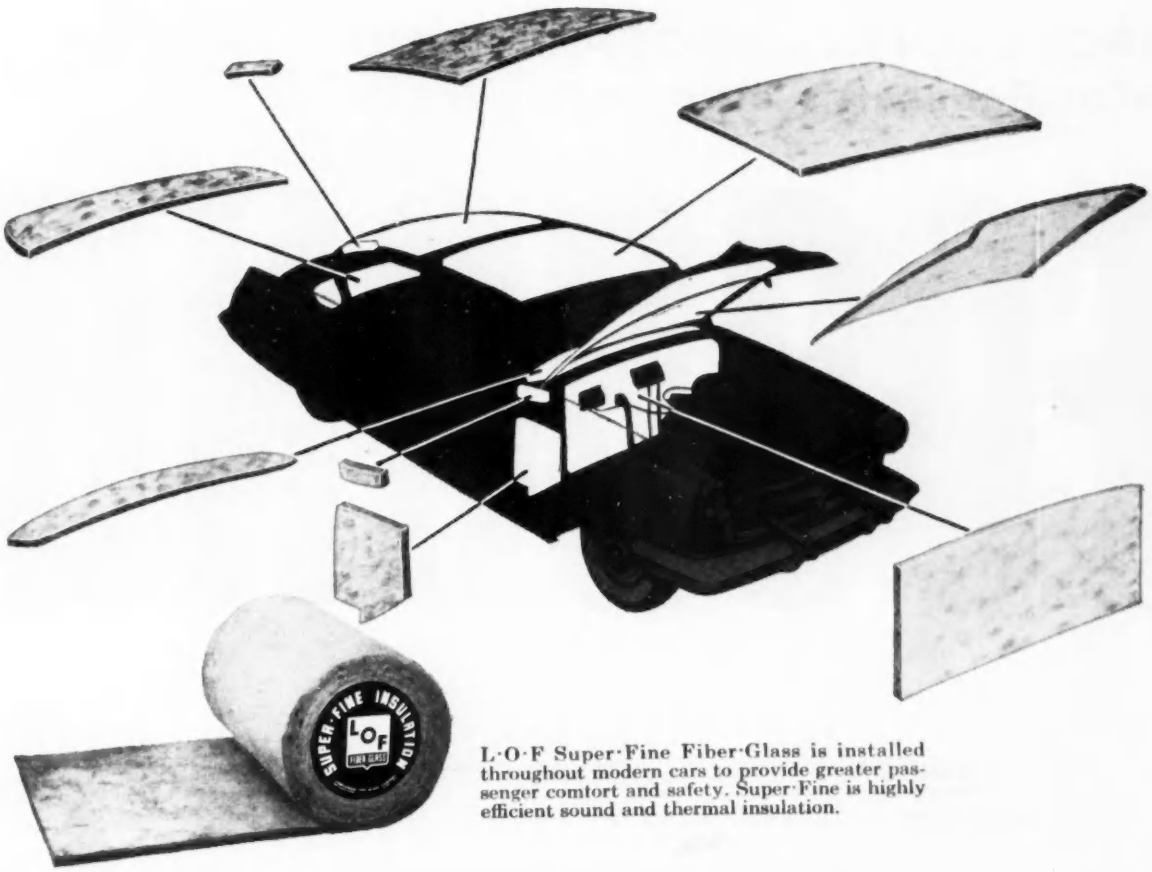
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MAKE IT STAINLESS...
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One good way is to specify stainless steel
Specify stainless not only for trim and accesories but for structural members as well.
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L·O·F Super·Fine Fiber·Glass is installed throughout modern cars to provide greater passenger comfort and safety. Super·Fine is highly efficient sound and thermal insulation.

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The successful effort to quiet an engine begins with attention to moving parts, and ends with a blanket of L·O·F Super·Fine Fiber·Glass installed under the hood and on the fire wall. There are few owner satisfactions to compare with an engine that never speaks above a whisper.

Inherently suited to those applications, L·O·F Super·Fine muffles high-frequency engine noise, tire whine, airstream whistle, helps block heat passage into car body. The glass fibers resist fire, oil, grease and most acids.

Other applications of L·O·F Super·Fine Fiber·Glass —liners in roof, under package trays, on dashboard—further support your continuing effort to offer customers engines that speak only in whispers and auto bodies that offer increased passenger comfort.

On your production lines, featherweight L·O·F Super·Fine is easily handled, quickly applied without lost motion. Of course, it almost goes without saying that you can depend on Libbey·Owens·Ford, with its long automotive experience, to deliver top-quality Super·Fine Fiber·Glass right on schedule.

For further information, call L·O·F's Detroit office, 610 Fisher Building, TRinity 5-0080. Or write us for the names of Hoodliner-Kit suppliers. Libbey·Owens·Ford Glass Co., Fiber·Glass Division, 7113 Wayne Building, Toledo 3, Ohio.

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with Pennsalt's outstanding NEW

FOSBOND

A COMPLETE SYSTEM—EVEN INCLUDING A DYNAMIC MERCHANDISING PLAN!

If phosphatizing has been a headache in your plant, here's the news you've been waiting for! Now Pennsalt, long a leader in the metal processing field, offers everything you need for uniform, trouble-free phosphatizing—for better, longer-lasting finishes.

The Fosbond Process comprises various Pennsalt-made chemicals for all operations from cleaning, pickling, and phosphatizing, through rinsing. They have been engineered to provide an excellent pre-paint corrosion-resistant surface while offering simplified operation through an entire balanced cycle. Major finish manufacturers have approved Fosbond for use wherever phosphate coatings are required under organic finishes.

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To help Fosbond users initiate and maintain this Process, Pennsalt offers technical assistance—on a regular, scheduled basis—from qualified, experienced specialists. These men will get the Process running smoothly on your operation and help you keep it that way.

But that's not all! Fosbond has qualified for the famous *Good Housekeeping Guaranty Seal*, which has been incorporated into the colorful Fosbond emblem (see illustration). To gain wide public acceptance, this new merchandising symbol is being advertised in *Good Housekeeping*, *The Saturday Evening Post*, and other publications. Authorized manufacturers may affix this emblem to their Fosbonded products—thus gaining a valuable sales "extra."

Ask us to prove it!

So you can see actual Fosbond test panels for yourself, we will send you either Fosbond chemicals with which you can prepare panels, or panels prepared in our laboratories which you can then test. You be the judge! Just tell us 1) type metal to be phosphatized, 2) phosphate coating now used, 3) method of application, 4) organic finish used, 5) standards finish must meet.

Or, give us details about your operation, and we shall gladly answer questions about Fosbond as specifically as possible. Write: Metal Processing Dept., 457 Widener Bldg., Philadelphia 7, Pa.

PROCESS





A COMPLETE SET OF COMPOUNDS

for cleaning, pickling, phosphatizing, and rinsing. All from one reliable source—Pennsalt



APPLIED IN A BALANCED CYCLE...

tailor-made by Pennsalt engineers to fit your operations and equipment



SERVICED AND MAINTAINED...

by experienced field servicemen on a regular, scheduled basis



ADVERTISED AND MERCHANDISED

to help pre-sell your quality finish to wholesalers, dealers, and consumers



At Pennsalt's famous Whitemarsh Research Laboratories, where Fosbond was developed, there are unusually fine testing facilities at the disposal of manufacturers using the Process.



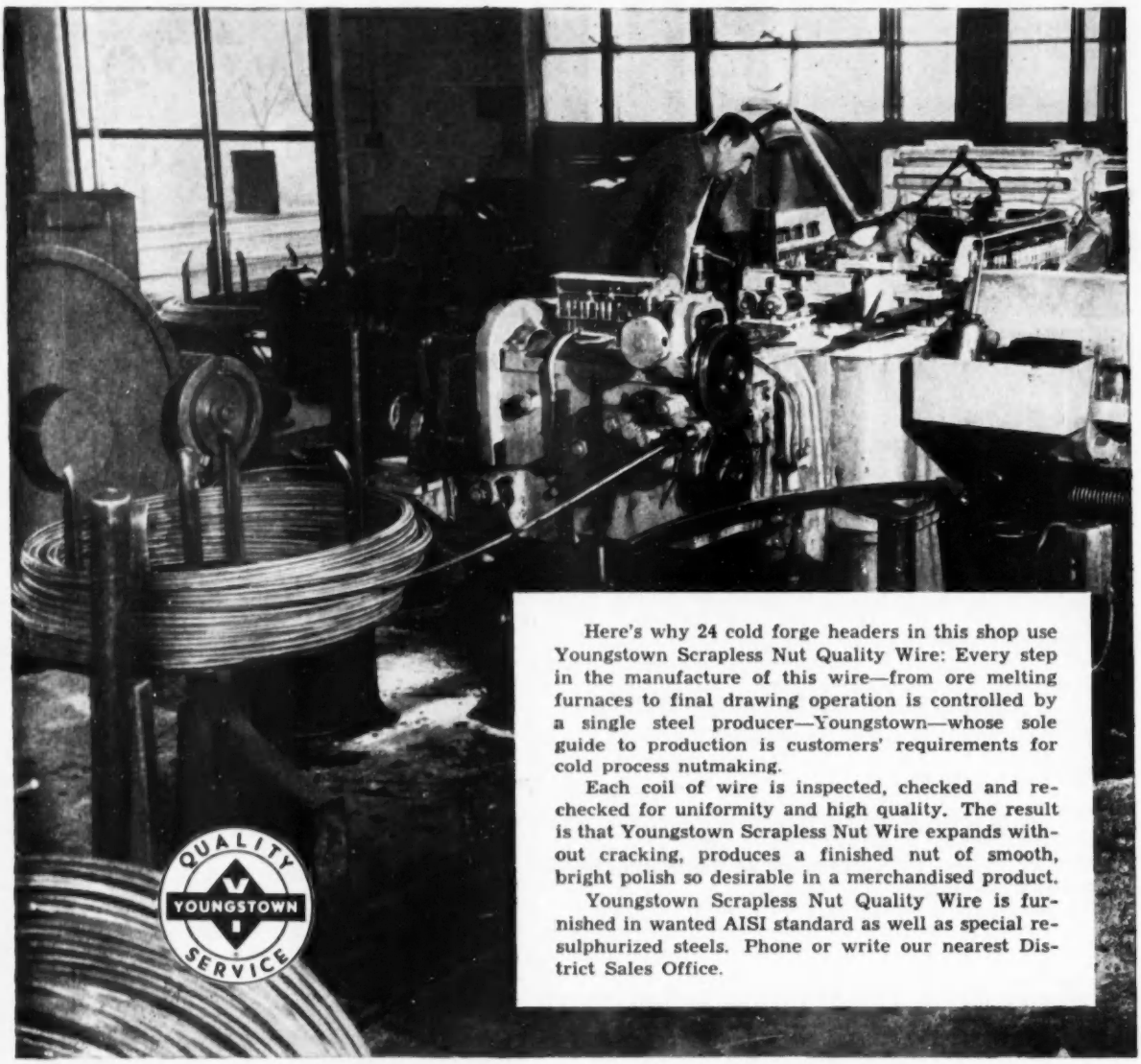
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A better start for your finish

Pennsalt Chemicals

PENNSYLVANIA SALT MANUFACTURING COMPANY

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Each coil of wire is inspected, checked and rechecked for uniformity and high quality. The result is that Youngstown Scrapless Nut Wire expands without cracking, produces a finished nut of smooth, bright polish so desirable in a merchandised product.

Youngstown Scrapless Nut Quality Wire is furnished in wanted AISI standard as well as special resulphurized steels. Phone or write our nearest District Sales Office.

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Takes off metal whiskers 6 times faster

...IMPROVES QUALITY

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Here, he helped convert a hand operation to automatic power brushing that greatly improved the product and increased output.

The job: To remove fine burrs at the slots of shaver heads and blend the surface junctures at the ends. The **OBA** helped develop the application of two Osborn brushes to an automatic "push-button" operation. Shaver heads are mounted in clamp fixtures on a rotating table. One brush runs clockwise and the other counter-clockwise, producing perfectly smooth, uniform surfaces. One operator turns out more than 1000 pieces per hour, compared to an output of about 150 per manhour formerly.

An Osborn Brushing Method can benefit *your* cleaning and finishing operations. Call your . . . **OBA** or write *The Osborn Manufacturing Company, Dept. E-11, 5401 Hamilton Ave., Cleveland 14, Ohio.*

FREE: *New booklet on deburring with Osborn Power Brushing. Write for your copy.*



Osborn Brushes

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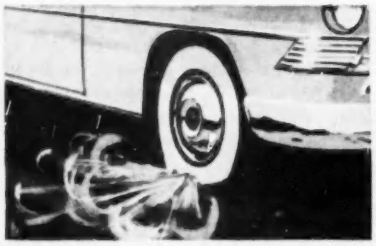


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SUREST **SAFEST** **SIMPLEST**



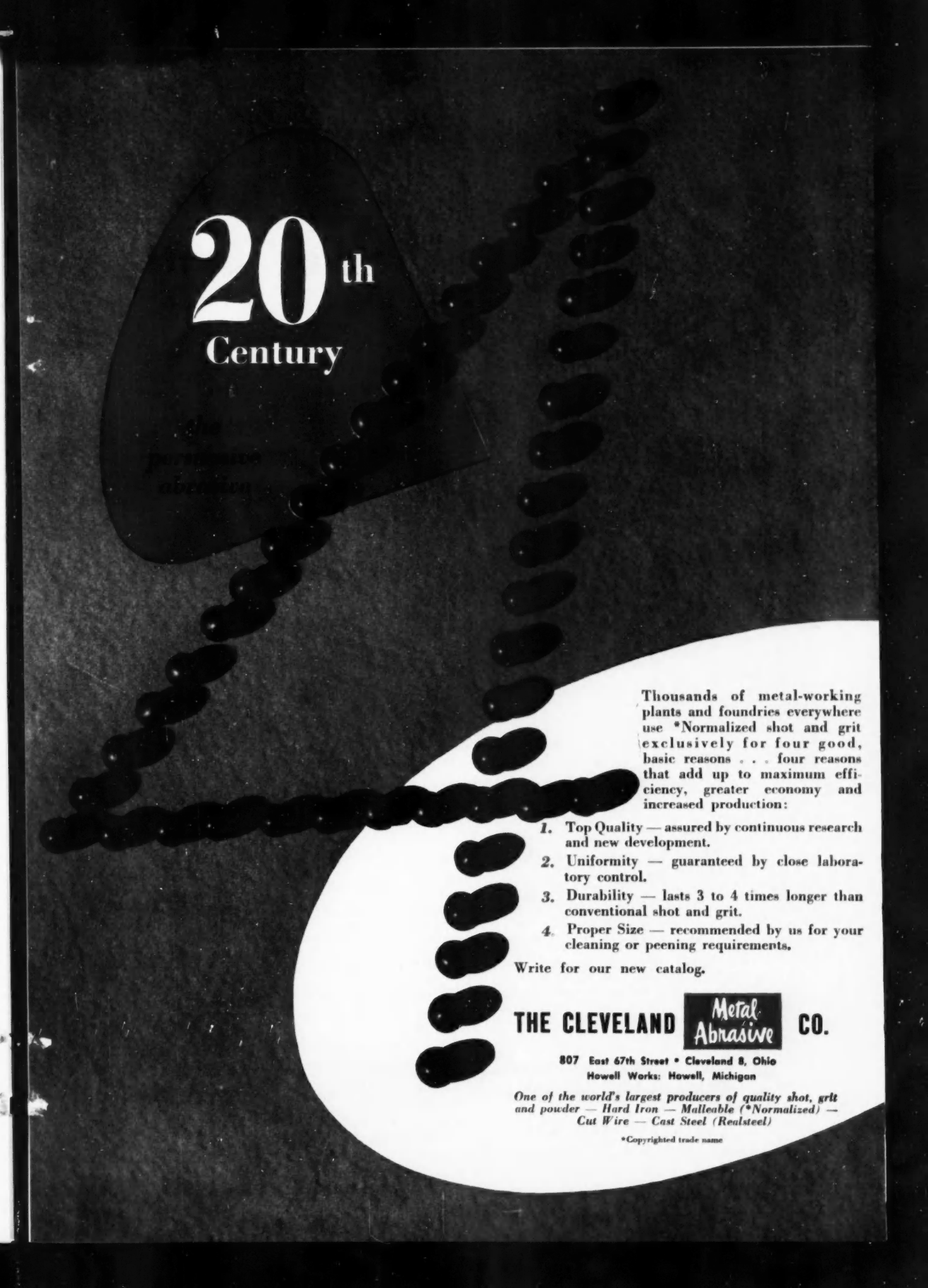
COMPLETE CONTROL— Monroe Power-Guide gives you the "feel of the road" at all times, yet absorbs road shock, eliminates wheel fight. Reduces nervous and muscular fatigue to absolute minimum.... leaves you relaxed, rested after day-long trips.



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Thousands of metal-working plants and foundries everywhere use *Normalized shot and grit exclusively for four good, basic reasons . . . four reasons that add up to maximum efficiency, greater economy and increased production:

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4. Proper Size — recommended by us for your cleaning or peening requirements.

Write for our new catalog.

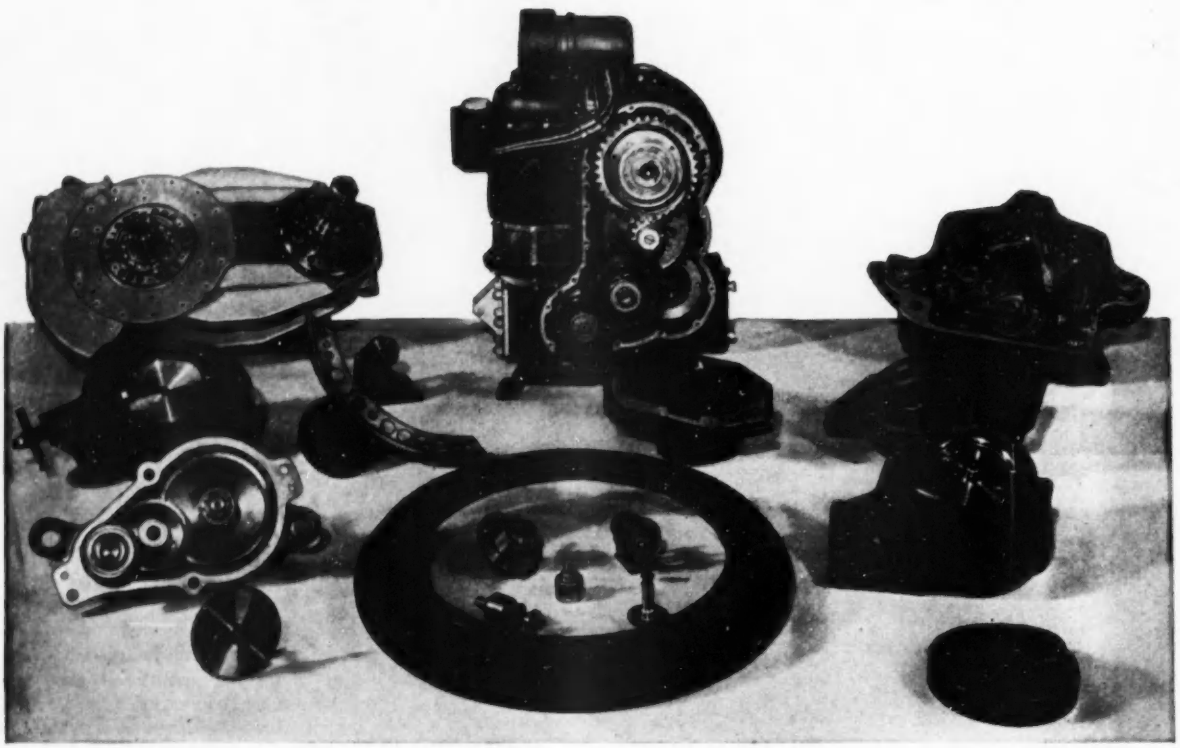
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ENGINEERS AND MANUFACTURERS • SPRINGFIELD, OHIO

TAKE A CLOSE LOOK AT TEMCO'S

3 coordinated plants!



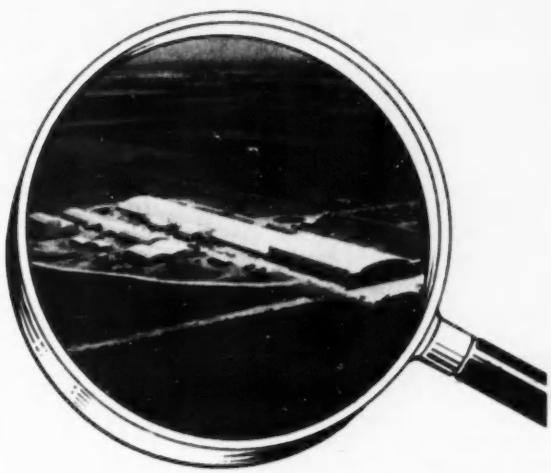
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Sixty miles northeast of Dallas is TEMCO's Overhaul Division . . . completely equipped for assembly-line modification and overhaul of multi-engine aircraft. TEMCO's comprehensive rehabilitation services are now offered to executive aircraft operators as well as the services and airlines.



TEMCO IN GARLAND, TEXAS

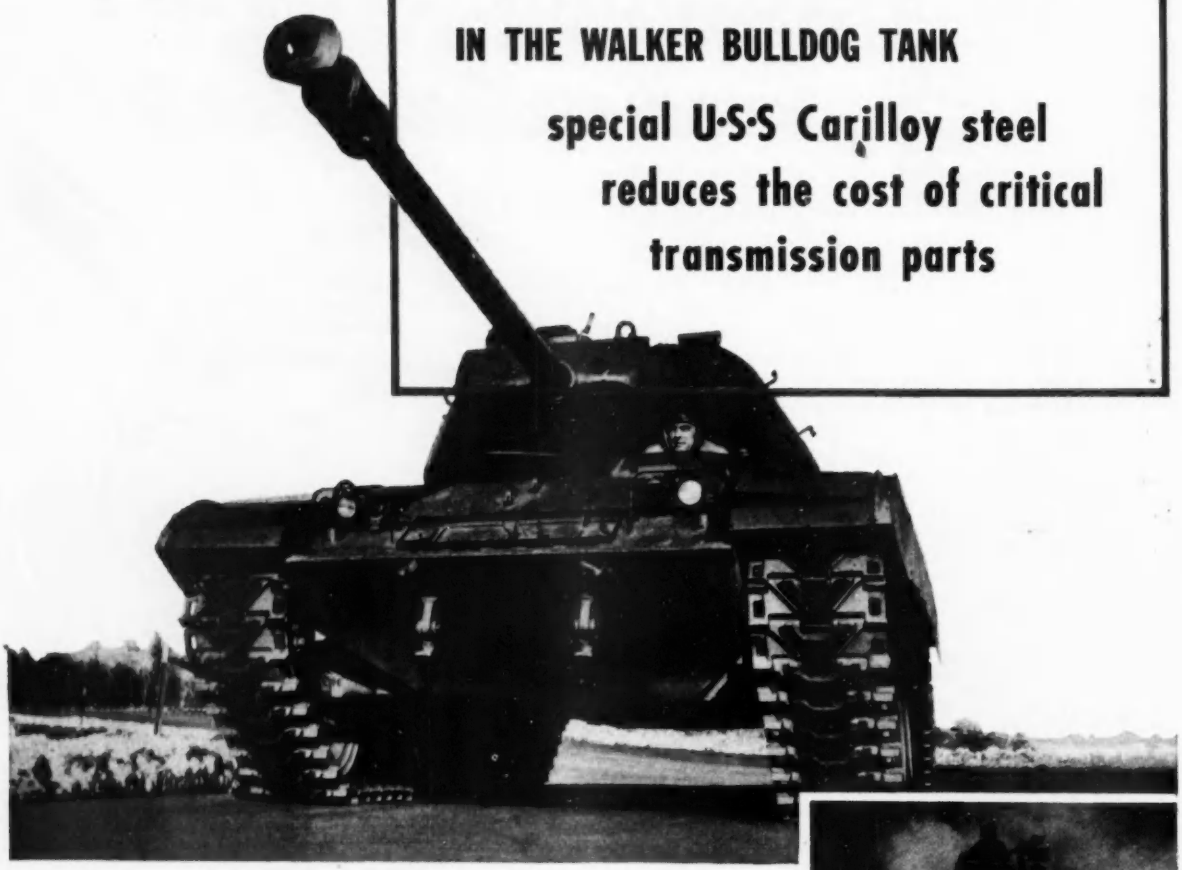
Only a few minutes away from the main plant is one of the most complete aircraft sub-assembly fabrication facilities in the Southwest. Recently completed expansion program has almost doubled working areas.

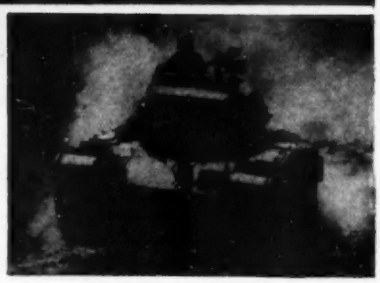


DALLAS, TEXAS

IN THE WALKER BULLDOG TANK

special U·S·S Carilloy steel reduces the cost of critical transmission parts





● How would you like to save $25 a ton on steel for your heavy-duty parts, without sacrificing quality? We bet you'd jump at the chance, just as the manufacturer of the Army's great Walker Bulldog Tank did.

U·S·S Metallurgists showed him how to make this important saving. They recommended special U·S·S-developed Superkore steel for the drive gears and pinions of this powerful machine. This steel provides the required hardenability, but contains less alloy than other steels capable of doing the job. Therefore, it costs less.

U·S·S Superkore also responds more uniformly to heat treatment and is easier to machine than ordinary alloy steels of equal hardenability.

U·S·S Superkore—now known as TS 43BV12 and adopted in both AMS and ASTM specs—is one example of the many important new developments that have come from the extensive research laboratories of United States Steel. From our constant effort to get the *most possible work* out of steel, at the *lowest cost* to you, have come better steels for use at high temperatures—better steels for use at extremely low temperatures—steels that are easier to machine—steels that are easier to heat treat—steels that in hundreds of ways help to solve production problems and reduce costs.

We may have ready for use or under development just the steel you need to solve a tough production problem. If we do, the U·S·S Service Metallurgist who contacts you will know about it. If we don't, we may be able to modify an existing U·S·S CARILLOY steel to suit your special requirements. In either event, it will pay to get in touch with us and find out.

If you have any question at all about alloy steels, write to United States Steel, Room 2818-Z, 525 William Penn Place, Pittsburgh 30, Pa.

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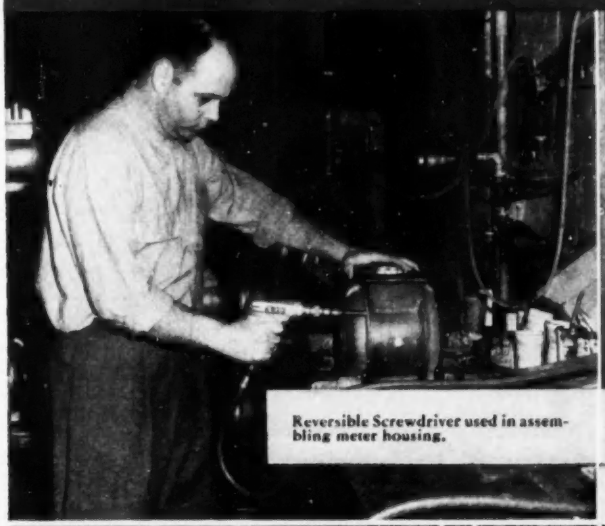
USS Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH — COMPLETE PRODUCTION FACILITIES IN CHICAGO OR PITTSBURGH

3-2089

UNITED STATES STEEL

ARO AIR TOOLS
Speed Assembly at SPRAGUE METER CO.



Reversible Screwdriver used in assembling meter housing.



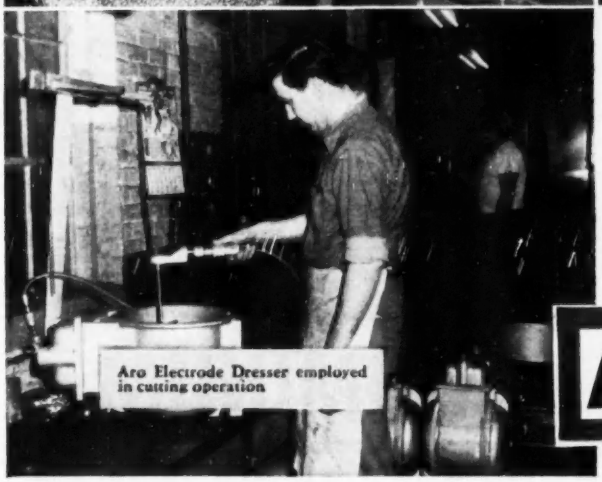
Screwdriver with adjustable clutch drives these screws to correct torque.



Aro hi-torque, slo-speed Screwdrivers and nut-setters mean less bit breakage and better driving control.



Aro Lever-Type Screwdrivers have fine performance records in continuous production.



Aro Electrode Dresser employed in cutting operation

Sprague Meter of Bridgeport says: "*We have been using Aro Air Tools in our Meter Assembly Department for nearly five years. These tools replaced former tools and methods . . . The performance and service have been outstanding. The assistance of your field engineer was invaluable . . .*"

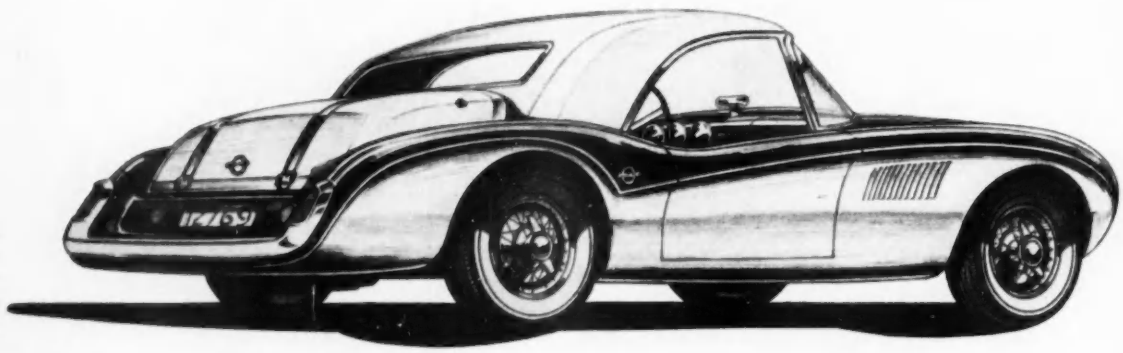
Let ARO help you increase production on jobs of drilling, grinding, polishing, screwdriving and other operations. *Contact your ARO distributor.*

The Aro Equipment Corp., Bryan, Ohio
Offices in All Principal Cities
Aro Equipment of Canada, Ltd., Toronto, Canada

ARO AIR TOOLS

Also . . . LUBRICATING EQUIPMENT . . . HYDRAULIC EQUIPMENT . . . AIRCRAFT PRODUCTS . . . GREASE FITTINGS

Aluminum takes to the highways



Reynolds looks forward with America's Foremost Designers



Duncan McRae

Sports car enthusiast and competition driver, Design Engineer McRae has styled for Chrysler Corporation, Kaiser-Frazer and Ford Motor Company.

In order to eliminate the greatest waste of horsepower, unnecessary weight and to achieve a dramatic mechanical outward appearance, Designer McRae advocates the use of aluminum for all body panels and takes advantage of aluminum's natural rich luster with an anodized protective coat to harmonize with painted upper surfaces. In addition, his modern design calls for aluminum inner door panels, windshield and window frames, instrument panel, firewall and floor assembly, splash shields and gas tank. Aluminum in these parts eliminates the rust problem, simplifies manufacture and replaces two pounds of dead weight for each pound of aluminum used.

Up-to-date stylists like Mr. McRae are specifying more and more aluminum in their designs because they are well aware of the many aluminum advantages such as those mentioned above. They know these advantages aid both in today's designs and in tomorrow's production.

Consult Reynolds Aluminum Specialists about your design or production problems. Call the Reynolds office listed under "Aluminum" in your classified telephone directory or write Reynolds Metals Company, 2587 So. Third St., Louisville 1, Ky.

SEE "Mr. Peepers" Sundays on NBC-TV. Consult local listing for time and station.

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND



Engineering consultation

Janitrol design engineers collaborate with the aircraft manufacturer in the field, and at home to develop simple, trouble-free, weight and space-saving heating installations.



Service training

Field office personnel organize and conduct operator service training programs on new installations and new equipment—often assist in establishing maintenance and overhaul programs, and facilities.

HERE'S HOW JANITROL "SERVICE TEAMS" PINPOINT SERVICE NEEDS EVERYWHERE!



Service testing

Janitrol engineers log hundreds of air hours each year as a continuing part of this program. Service qualification testing, using the most modern facilities, supported by experienced planning, all functions of skilled Janitrol service teams.



Aircraft Heating Digest

A quarterly publication of authoritative aircraft heating equipment service, design, installation, and trouble-shooting articles especially prepared for aircraft engineering and service personnel. A subscription is yours, free for the asking.

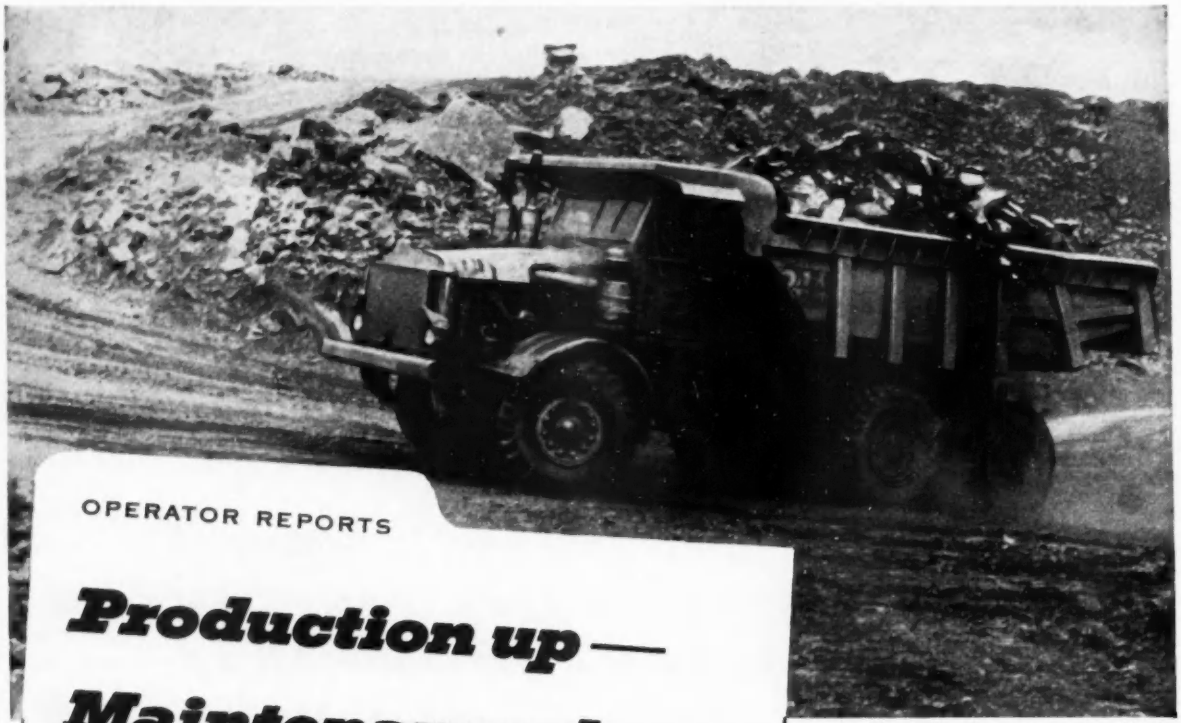
The continuing basic research programs conducted by stay-at-home Janitrol engineers rounds out the "team" that provides more *right answers* to aircraft heating problems. Whether your problem is heat for aircraft, ground equipment or standby needs, get Janitrol in at the design stage, and you'll get the job done quicker.

Janitrol

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AIRCRAFT-AUTOMOTIVE DIVISION, SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

National Sales, Engineering, Production Headquarters, 400 Dublin Ave., Columbus 16, Ohio. District Engineering Offices: New York, 225 Broadway; Washington, D. C., 4650 East-West Highway; Kansas City, 2201 Grand Ave.; Ft. Worth, 2509 West Berry St.; Hollywood, Calif., 7046 Hollywood Blvd.; Columbus, Ohio, 400 Dublin Ave. Executive Offices: 2375 Dorr St., Toledo 1, Ohio.



OPERATOR REPORTS

Production up — Maintenance down

Twenty of these Allison TORQMATIC-equipped trucks are working 21 hours a day hauling 34-ton pay loads of coal and overburden over 7½% grades.

The Wadesville Production Company operates 20 Allison TORQMATIC-equipped Euclid rear-dump trucks hauling 42,000 tons daily in its strip mine near St. Claire, Pa. These trucks boost production by making round trips 25% faster than the mechanical-drive units they replaced.

This operator's records show TORQMATIC DRIVES outlast mechanical drives — maintenance time and costs are down too. At routine overhaul periods, mechanics change out the TORQMATIC DRIVES in 2 hours less time than they change out a mechanical drive.

You, too, can cut your heavy-duty equipment operating costs by specifying Allison TORQMATIC DRIVES the next time you buy. Ask your equipment dealer, manufacturer or write:

ALLISON *Division of* GENERAL MOTORS
Box 894AA, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

Unbeatable Team for Maximum Operating Economy

**Quick-shifts* at full throttle with fingertip hydraulic control.

**Holds* power to load at all times — no clutch pedal to push—no gearshift guess.

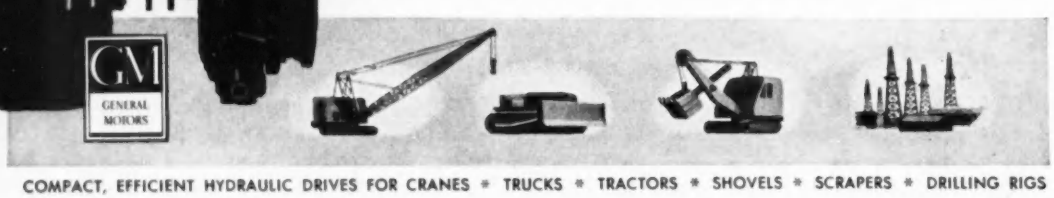
**Cuts* maintenance cost by absorbing shock—eliminates engine lugging—prolongs equipment life.

**Only* torque converter-transmission team designed to work as a unit and built by one manufacturer.

MATCHED UNITS BUILT BY ONE MANUFACTURER

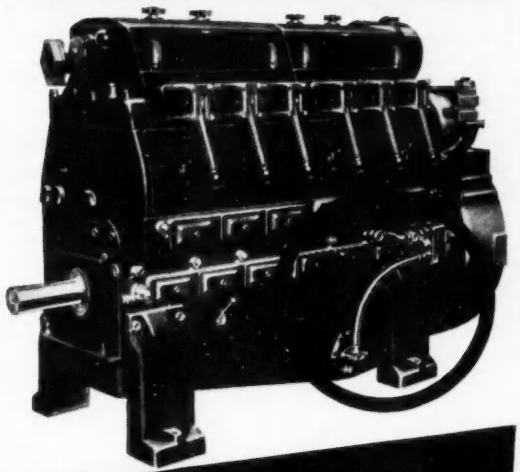


Allison TORQMATIC DRIVES



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on gasoline & fuel lines, lubricating oil lines



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Alcoa Utilitube* is corrosion-resistant aluminum coiled tube made of a special alloy (50S) to provide *low cost, easy workability* and *high fatigue strength.* It actually offers you savings up to 40 per cent over other corrosion-resistant metals.

Alcoa Utilitube is ideal for instrument air lines—carrying gasoline and fuel for internal combustion engines—lubricating oil for engines and machines—fluids for hydraulic systems.

Alcoa Utilitube bends more easily than annealed copper . . . work hardens less . . . has excellent forming and flaring characteristics. It will not cause sludge or gum formations. It will not discolor or contaminate the fluid it carries. It safely resists corrosion by hundreds of hard-to-handle compounds and industrial atmospheres. In extremely low temperatures, mechanical properties actually improve.

For complete information, write for the new booklet: "Alcoa Utilitube."

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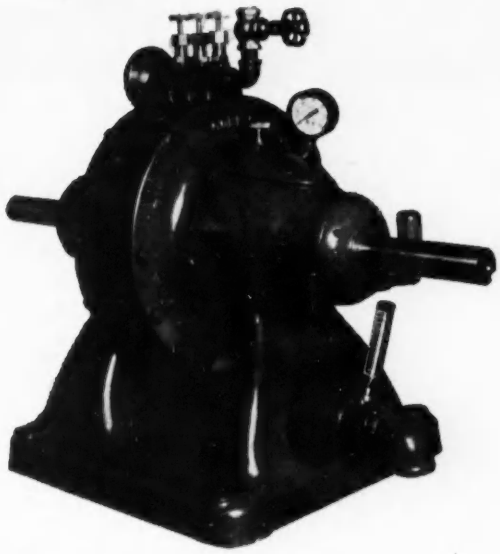
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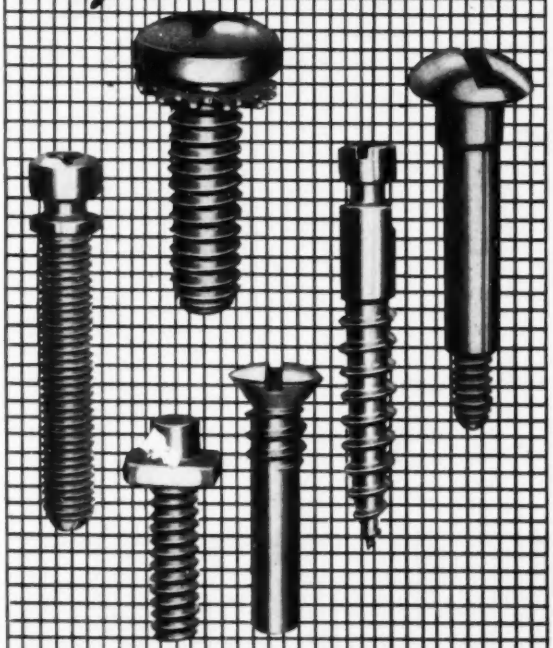
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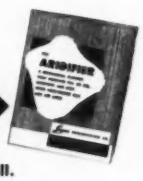
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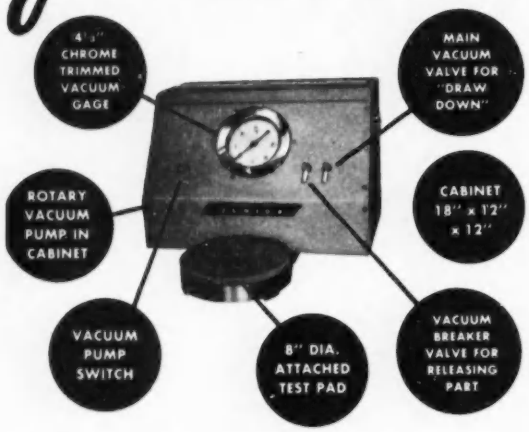
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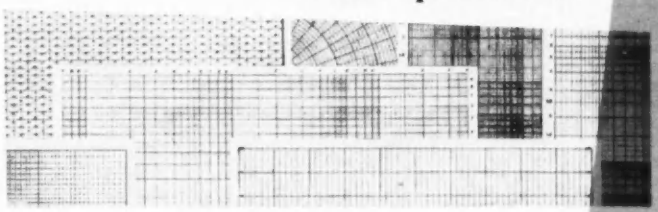
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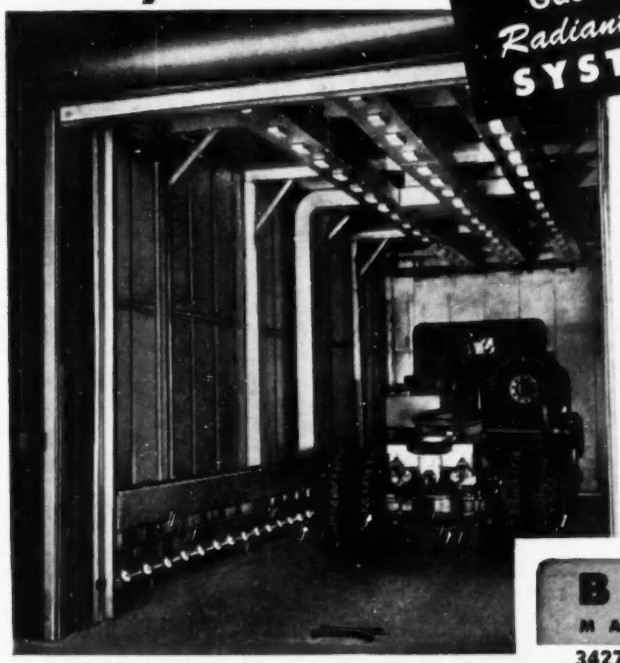
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large Army, Navy and Air Corps trucks and tractor sections of semi-trailers are driven in and out of Burdett "Radiant Heat" Ovens under their own power. Safe? Certainly! And the fastest and most economical dry as well. Paint is synthetic enamel, which is thoroughly dried on *all* parts of these trucks, including the extra heavy channels and 5th wheel section in 20 minutes at 180° F.

The tougher competition gets—the more you will profit with a Burdett System. No obligations for recommendations — send us your plant and production data now!

● Truck in tunnel type batch style Burdett Oven. Oven measures 14'4" x 17' x 36'8".

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Also Manufacturers of "Radiant Heat" Systems, Ovens, Heaters, Air Make-Up Units, Spray Booths and Washers.

Multiform

BIG BROTHER BENDER



Illustrated above are a few of the many forms that can be produced efficiently on the Multiform Bender.

Model BBB



SMALLER MODELS AVAILABLE

AIR OPERATED MODELS IN FOUR SIZES

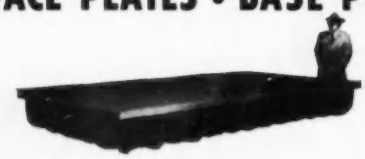
The heavy duty Big Brother Bender is designed for fabricating bus bars, brackets, fixtures, etc., without special tooling. Air controlled with finger tip response. Comes complete with dies, mandrels and wrenches — punching and blanking dies extra. Will punch holes up to 1" and form material up to ¼" thick by 4" wide. We also build smaller models, hand or air operated, for bending materials up to ⅛" x 1½".

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of fine-grained LAKENITE castings . . .

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layout tables
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special castings of all kinds
welding plates

Lake Shore base plates are cast in single pieces up to 10′ x 15′. Standard surface plates made in sizes up to 5′ x 10′. Larger base plate units composed of sections and any special engineering your job might require can be provided by Lake Shore. Contact your nearest representative or send data to:

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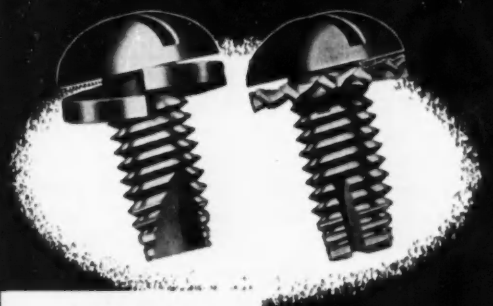
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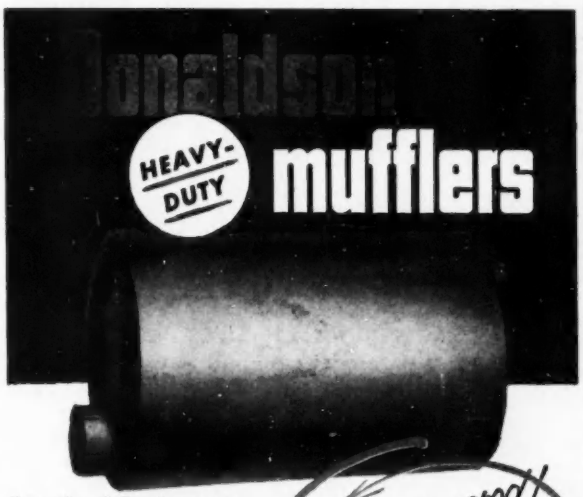
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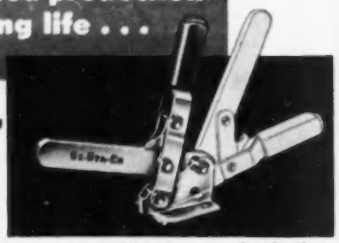
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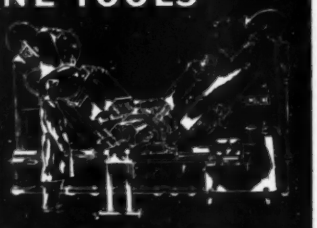
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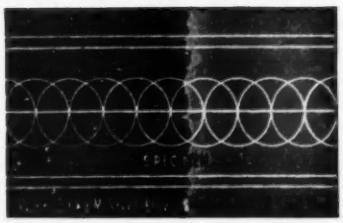


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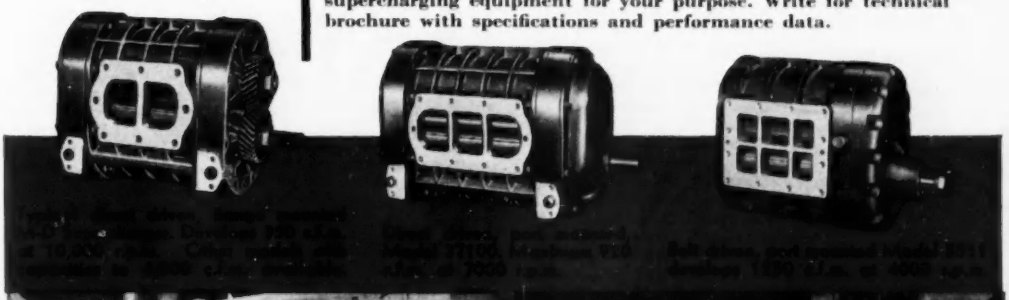
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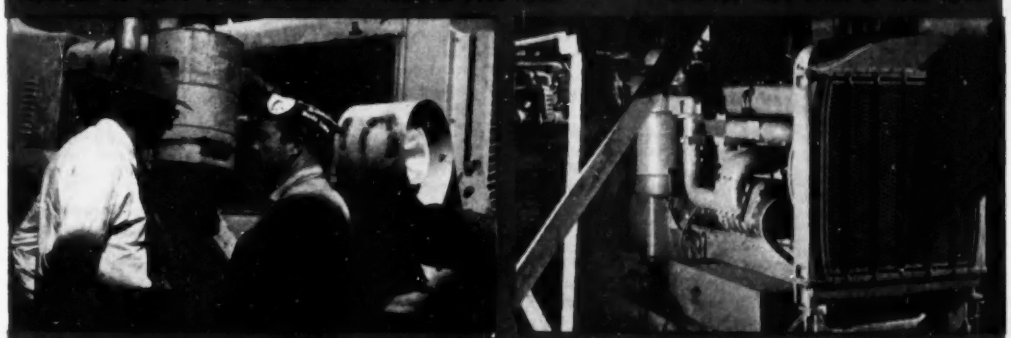
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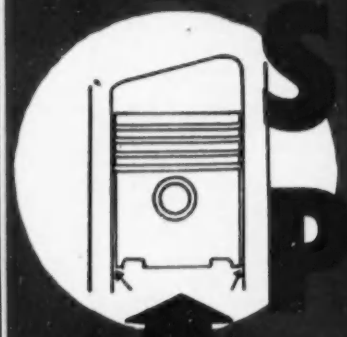
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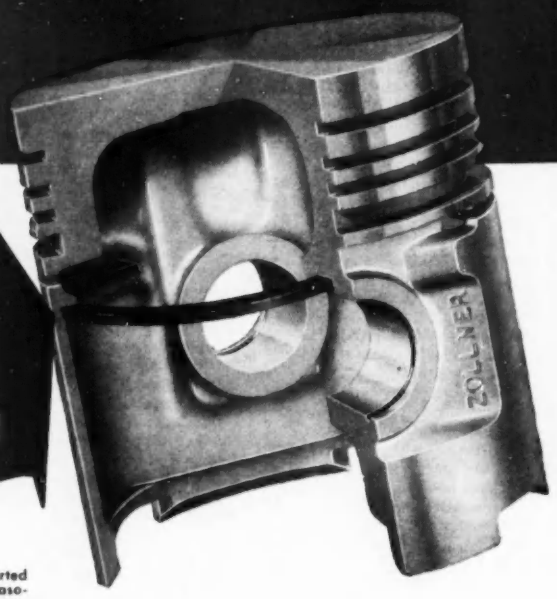
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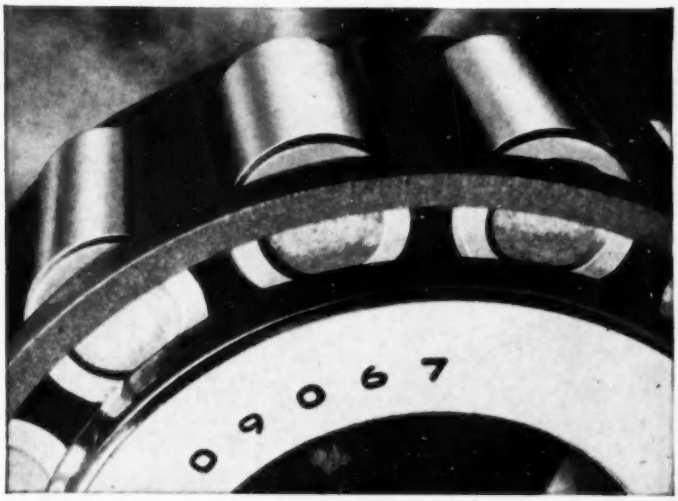
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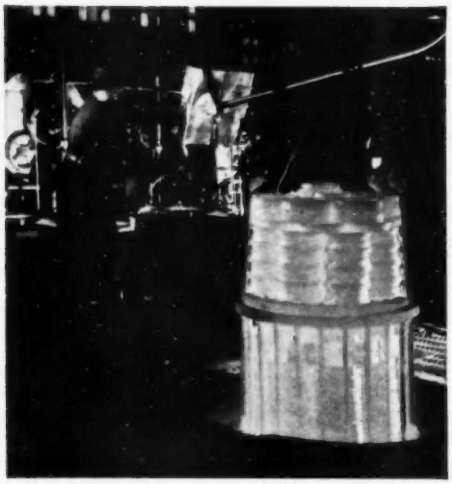
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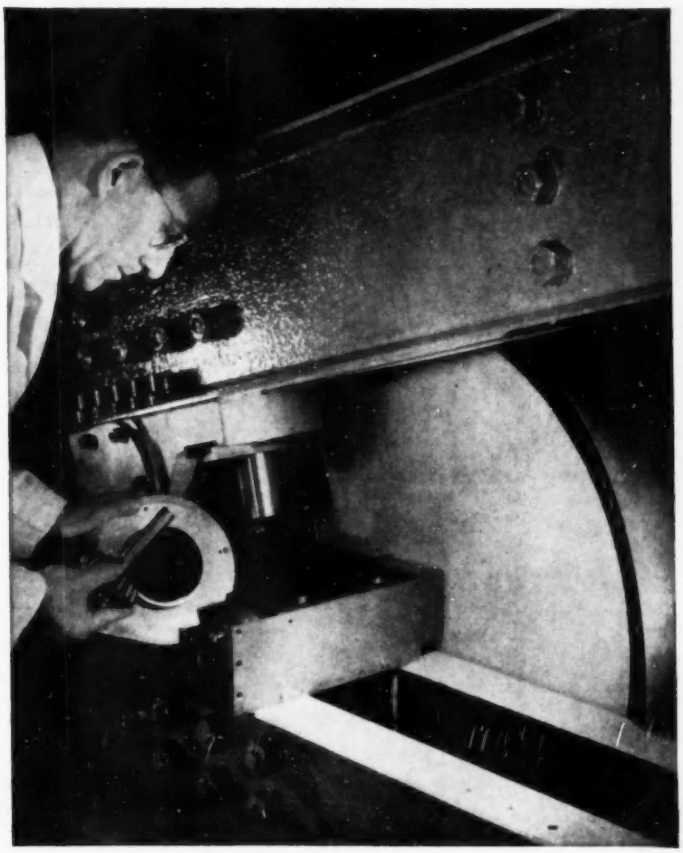
The story behind a number



The number 09067 on the bearing cone shown above—coupled with 09195 on the cup—tells a short story. It is a certain size tapered roller bearing used on front wheels. But since the trade-mark "Timken" is also stamped on the bearing, the number tells the complete story about the bearing's quality and the service that goes with it.



To case-harden every race and roller, we built the world's largest battery of carburizing furnaces, man them 168 hours a week. It's typical of the many costly extra steps that go into Timken bearings to make them the number 1 value for your car's moving parts—the vital zone.



It helps design tomorrow's bearings. Can Timken bearings be made to last even longer? A continuous, large-scale research program is helping us find out. This machine, for instance, tests the effect of vibration on bearings. It's one more reason to specify "Timken" with the bearing number. And for *full* value, always use a Timken bearing cup with a Timken bearing cone. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN is number 1 for VALUE where value counts most . . . in the vital zone

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⫿ AND THRUST →⫿← LOADS OR ANY COMBINATION →✳←